SHARP SERVICE MANUAL

CODE: 00ZERA450VSME

ELECTRONIC CASH REGISTER

MODEL ER-A450

SRV Key : LKGIM7113RCZZ
PRINTER : PR-45M

("V" version)

CAUTION
EXTREME CAUTION MUST BE TAKEN WHEN SERVICING THIS MACHINE. EVEN THOUGH THE MODE SWITCH IS IN THE OFF POSITION, VOLTAGE IS STILL SUPPLIED TO THE ENTIRE MACHINE.
WHEN WORKING ON THIS MACHINE MAKE SURE THAT THE POWER CORD IS REMOVED FROM THE WALL OUTLET.

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PARTS GUIDE

Parts marked with "⚠ " is important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

SHARP CORPORATION

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The contents are subject to change without notice.

CHAPTER 1. SPECIFICATIONS

1. Appearance/Rating

1) Rating

Power source	AC 230V or local voltage ±10% 50/60Hz
Power consumption	Standby: 14 W Maximum: 41 W (max.)
Operating temperature	0°C ~ 40°C (32°F ~ 104°F)
Operating humidity	10% ~ 90% (RH)
Physical dimensions, including the drawer	355(W) × 424(D) × 308(H)mm 16.5(W) × 16.8(D) × 11.5(H)in.
Weight	13 kg

2. Keyboard

1) Standard keyboard layout

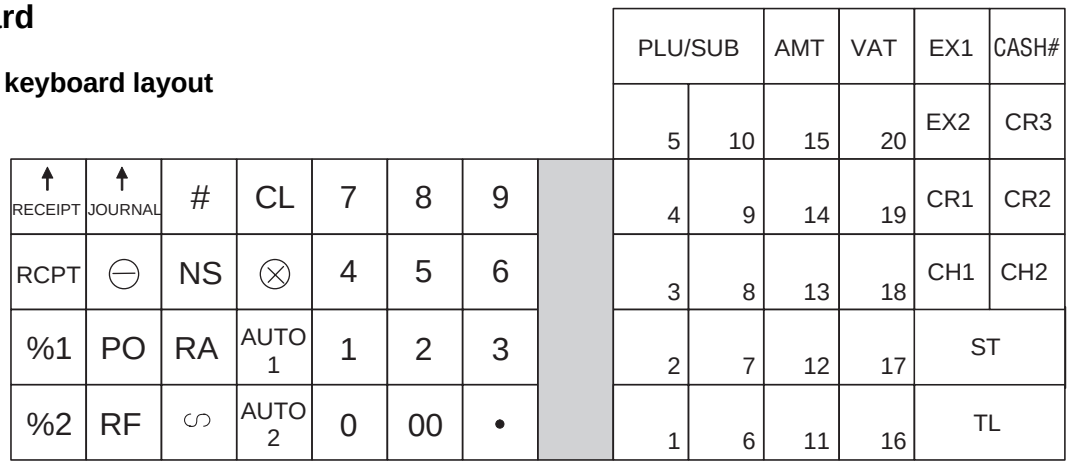


Fig. 2-1

2) Key top name

① Standard Key Top

KEY TOP	DESCRIPTION
0 to 9, 00	Numeric keys
•	Decimal point key
CL	Clear key
⊗	Multiplication key
1 to 20	Department keys
↑RECEIPT	Receipt paper feed key
↑JOURNAL	Journal paper feed key
RCPT	Receipt print and Receipt on/off key
%1, %2	Percent keys
⊖	Discount key
PO	Paid out key
RF	Refund key
#	Non-add code entry key
NS	No sale key
RA	Recived on account key
∽	Void key
AUTO1, AUTO2	Automatically entry keys
PLU/SUB	PLU/Subdepartment code entry key
AMT	Amount entry key
VAT	Value added tax key
EX1, EX2	Foreign currency exchange keys
CASH#	Cashier code entry key
CR1, CR2, CR3	Credit keys
CH1, CH2	Check keys
ST	Subtotal key
TL	Total (Cash eoeal) key

② Optional Key Top

KEY TOP	DESCRIPTION
21 to 50	Department 21 to 50 key
GC COPY	Guest check copy key
PRINT	Validation print key
%3, %4	Percent keys
⊖2, ⊖3, ⊖4	Discount key
AUTO3 ~ AUTO10	Automatically entry keys
CA2	Cash total 2 key
CH3, CH4	Check keys
CR4	Credit key
EX3, EX4	Foreign currency exchange keys
RA2	Recived on account key
PO2	Paid out key
1/2	1/2 key
VAT SHIFT	Value added taxahift key
DIFFER ST	Difference subtotal key
CLERK #	Clerk code entry key
000	Numeric key
1 to 68	Direct price look up/Subdepartment keys

3. Mode switch

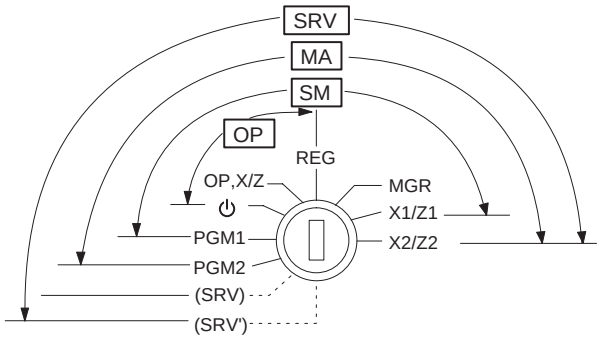


Fig. 3-1

* The key can be removed in the REG or OFF position.

* In the SRV' mode, key inputs are prohibited and no display is made.

[Functions]

- Function for each key position
- SRV': System reset
- SRV: Service mode (Service programming)
- PGM2: Allows programming of an item that is not changed frequently, in addition to the PGM1 mode programming.
- PGM1: Allows programming of items frequently changed (e.g. department, PLU pricing, and discount rate setting).
- OP, X/Z: Allows X or Z operation by clerks or cashiers.
- REG: Allows registrations.
- MGR: Allows the operations, by authorized person such as a manager (e.g. correction after transaction finished or cancellation of entry limits), which are not permitted to ordinary cashiers.
- X1/Z1: Allows reading and resetting of a day's sales total.
- X2/Z2: Allows reading or resetting sales totals in a specified period.
- &: Switching off the display to prevent key board entries.

4. Display

1) Layout

① Operator display

Fig. 4-1

	7 segment display (LED)
No. of positions	10
Color of display	Yellow Green
Character size	14.2 (H) × 8.0 (W) mm

② Customer display (Pop-up display)

Fig. 4-2

	7 segment display (LED)
No. of positions	7
Color of display	Yellow Green
Character size	14.2 (H) × 8.0 (W) mm

Display contents

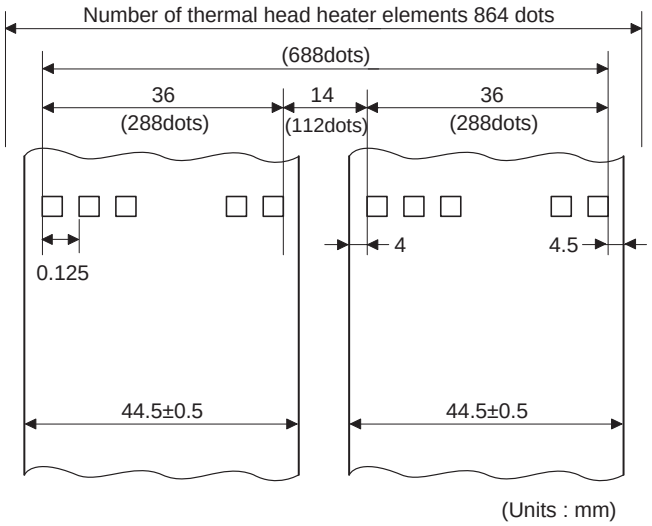
	Display Position	Description
Amount	1-8	
Minus sign	4-10	–: Floating
Error	10	E
PGM Mode	10	P
VOID Mode	10	u
TL, CH, CR	10	F: Lights up when a registration is finalized by depressing TL, CH, CR key
SUB TOTAL/ short tender	10	o
Change	10	C: Light up whenever the change due amount appears in the display.
Department	9-10	No zero-suppressed
PLU	5-10	No zero-suppressed
Repeat	8	Endless count, starting from 2.
Decimal point	3-1	TAB
Receipt OFF	9	_
Cashier No.	2-3	–xx–: free code
Clerk No.	2-3	C–xx–: clerk code
VP compulsory	10	U: Light up when the validation printing is compulsory
CCD compulsory	10	C: Light up when CCD is compulsory.
VAT shift	8	•
Sentinel	10	•

5. Specifications

1) Printer (PR-45M)

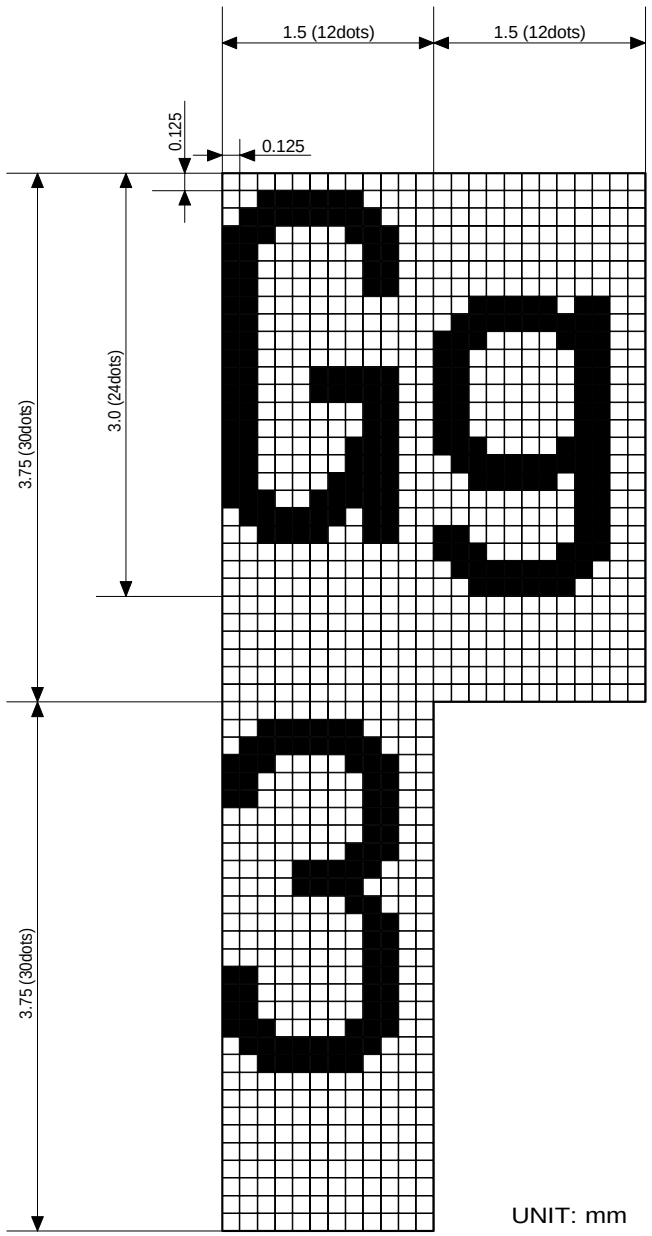
- No. of station: 2: Receipt and Journal
- Validation: No
- Printing system: Line thermal
- No. of dot: Receipt: 288 dots
Journal: 288 dots
- Dot pitch: Horizontal: 0.125 mm
Vertical: 0.125 mm
- Font: 10 dots (W) × 24 dots (H)
- Printing capacity: Receipt: Max. 24 characters
Journal: Max. 24 characters
- Character size: 1.25 mm (W) × 3.0 mm (H):
At 10 × 24 dots
- Print pitch: Column distance: 1.5 mm
Row distance: 3.75 mm
- Print speed: Approximate 50 mm/s (13.3 lines/sec)
- Paper feed speed (Manual feed): Approximate 40 mm/s
- Reliability: Mechanism MCBF 5 million lines
Head life 5×10^7 pulses
- Paper end sensor: Yes (Receipt and Journal)

- Cutter: Manual
- Paper near end sensor: No
- Printing area:



(Units : mm)

- Print format:



UNIT: mm

- Option: For PR-58M: ER-01AC (Auto cutter unit)

2) Paper

Item	Description
Name	Heat-quality paper
Roll dimension	44.5 ± 0.5 mm in width
Thickness	0.06 mm to 0.08 mm

3) Cutter

- Method: Manual

6. Drawer

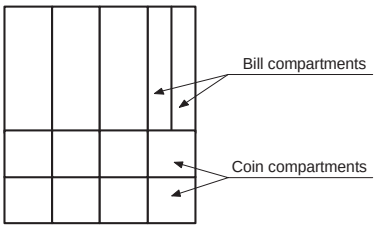
1) Specification

(1) Drawer box and drawer

Model name	SK-420
Size	355 (W) × 424 (L: included lock key) × 120 (H: included rubber leg)
Color	GRAY 368
Material	Metal
Bell	—
Release lever	Standard equipment; Situated at the bottom
Drawer open sensor	Standard equipment

2) Money case

Separation from the drawer	Allowed
Separation of the coin compartments from the money case	Allowed
Bill separator	—
Number of compartments	5B/8C



5B/8C

3) Lock

Location of the lock	Front	
Method of locking and unlocking	Locking:	Insert the drawer lock key into the lock and turn it 90 degrees counterclockwise.
	Unlocking:	Insert the drawer lock key into the lock and turn it 90 degrees clockwise.
Key No.	SK1-1	

CHAPTER 2. OPTIONS

1. System configuration

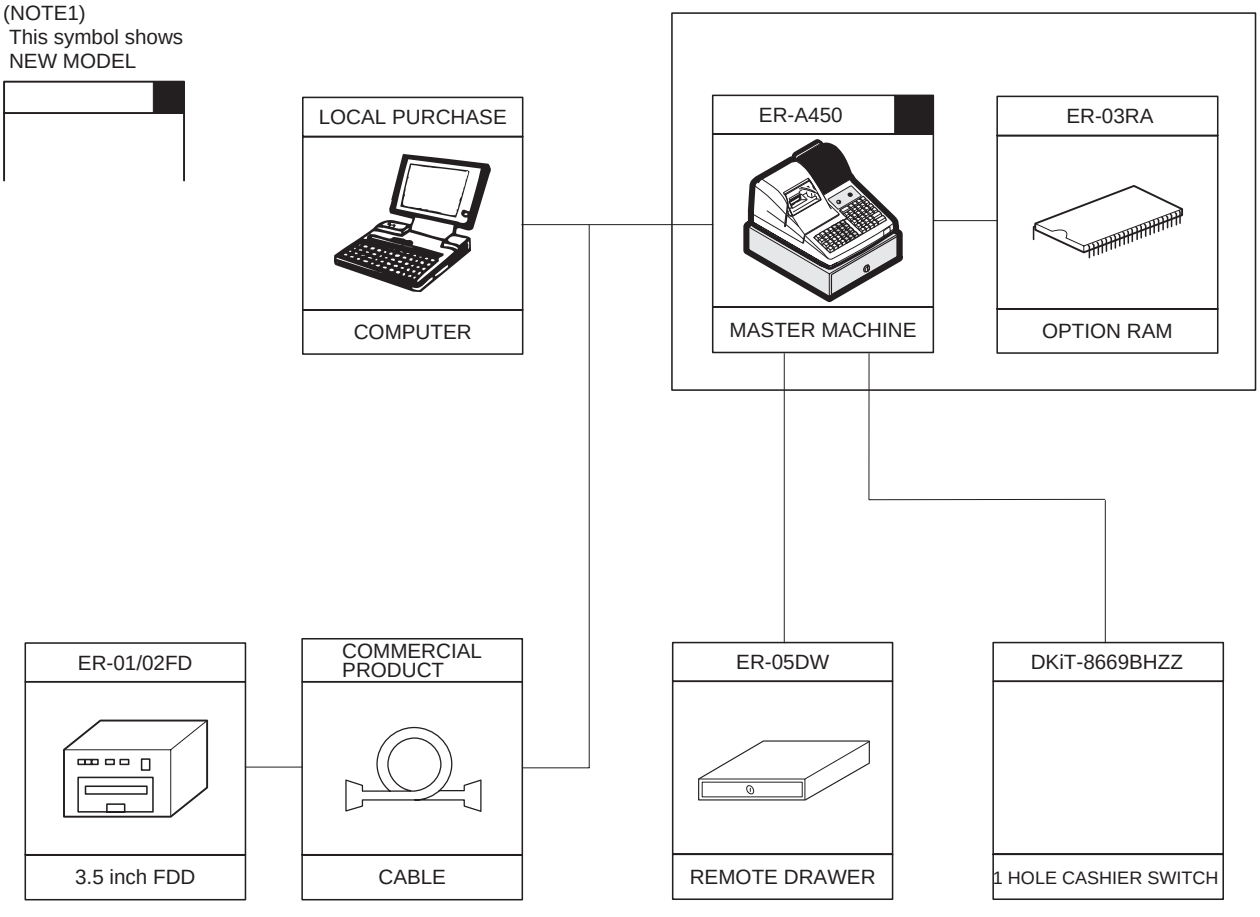


Fig. 1-1

2. Options

No.	NAME	MODEL	DESCRIPTION
1	EXPANSION RAM CHIP	ER-03RA	512K bytes RAM CHIP
2	REMOTE DRAWER	ER-05DW	
3	PRESETS LOADER	ER-01FD/02FD	FD unit
4	KEY TOP KIT	ER-11KT7	1 × 1 KYE TOP UNIT
		ER-12KT7	1 × 2 KYE TOP UNIT
		ER-22KT7	2 × 2 KYE TOP UNIT
		ER-11DK7G	1 × 1 DUMMY KYE KIT
		ER-51DK7G	5 × 1 DUMMY KYE KIT
5	COIN CASE	ER-58CC	5B/8C
6	COIN CASE COVER	ER-03CV	5B/8C
7	EFT I/F	ER-01EF	

3. Service options

No.	NAME	PARTS CODE	PRICE RANK	DESCRIPTION
1	SERVICE KEY	LKGiM7113RCZZ	AF	
2	MODE KEY GRIP COVER	LKGiM7126RCZZ	AL	OP key only
3	DRIP-PROOF KEYBOARD COVER	GCŌVH7126BHZZ	BE	Include the switch cover
4	JOURNAL NEAR END SENSOR UNIT	DUNTK3677BH03	BB	Q'ty: 1
	Screw (Sensor unit – Top cabinet)	XEBSD30P08000	AA	Q'ty: 1
	Screw (Sensor unit – Earth wire – Top cabinet)	XHBSD30P04000	AA	Q'ty: 1
	Screw (Earth wire – Top cabinet)	LX−BZ6778BHZZ	AA	Q'ty: 1
	Earth wire	QCNW−7895BHZZ	AF	Q'ty: 1
	Connector (2pin)	QCNCM6865RC0B	AA	Q'ty: 1
5	TEXT PRESET KEYBOARD COVER	GCŌVB7153BHZZ	BH	
6	ONE HOLE CASHIER KEY KIT	DKiT−8669BHZZ	—	
7	ER-01EF CONNECTING KIT	DKiT−8673BHZZ	—	

4. Service tools

No.	NAME	PARTS CODE	PRICE RANK	DESCRIPTION
1	RS-232 LOOP BACK CONNECTOR	UKŌG−6705RCZZ	BU	
2	KEY TOP REMOVER	UKŌG−6634RCZZ	AX	
3	2 × 2 KEY TOP INSTALLING JIG	UKŌG−6725BHZZ	BP	

5. Supplies

No.	NAME	PARTS CODE	PRICE RANK	DESCRIPTION
1	ROLL PAPER	TPAPR6645RC05	AY	5 roll/pack

CHAPTER 3. SRV. RESET AND MASTER RESET

1. SRV. reset (Program Loop Reset)

Used to return the machine back to its operational state after a lock-up has occurred.

Procedure

- Method 1
  1) Unplug the AC cord from the wall outlet.
  2) Set the mode switch to (SRV′) position.
  3) Plug in the AC cord to the wall outlet.
  4) Turn to (SRV) position from (SRV′) position.
- Method 2
  1) Set the mode switch to PGM2 position.
  2) Turn off the AC switch.
  3) While holding down JOURNAL FEED key and RECEIPT FEED key, Turn on the AC switch.

Note: When disassembling and reassembling always power up using method 1 only. Method 2 will not reset the CKDC8.

Note: SRV programming job#926-B must be set to "4" to allow PGM program loop reset.

2. Master reset (All memory clear)

There are two possible methods to perform a master reset.

- MRS-1

  Used to clear all memory contents and return machine back to its initial settings and return keyboard back to default keyboard layout.

Procedure

1) Unplug the AC cord from the wall outlet.
2) Set the MODE switch to the (SRV′) position.
3) Plug in the AC cord to the wall outlet.
4) While holding down JOURNAL FEED key, turn to (SRV) position from (SRV′) position.

- MRS-2

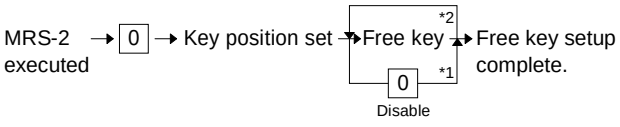
  Used to clear all memory and keyboard contents.
  This reset returns all programming back to defaults. The keyboard must be entered by hand.
  This reset is used if an application needs different keyboard layout other than that supplied by a normal MRS-1.

Procedure

1) Unplug the AC cord from the wall outlet.
2) Set the MODE switch to the (SRV′) position.
3) Plug in the AC cord to the wall outlet.
4) While holding down JOURNAL FEED key and RECEIPT FEED key, turn to (SRV) position from (SRV′) position.
5) Key position assignment:

* After the execution of MRS-2, only the RECEIPT FEED and JOURNAL FEED keys can remain effective on key assignment. Any key can be assigned on any key position on the main keyboard.

[key setup procedure]



NOTES:

* 1: When the 0 key is pressed, the key of the key number on display is disabled.

* 2: Push the key on the position to be assigned. With this, the key of the key number on display is assigned to that key position.

Key number	Key name	Key number	Key name
1	Numeric key "0"	10	Numeric key "9"
2	Numeric key "1"	11	Numeric key "00"
3	Numeric key "2"	12	Numeric key "000"
4	Numeric key "3"	13	Decimal point key
5	Numeric key "4"	14	CL key
6	Numeric key "5"	15	⊗ key
7	Numeric key "6"	16	ST key
8	Numeric key "7"	17	TL key
9	Numeric key "8"		

CHAPTER 4. HARDWARE DESCRIPTION

1. Hard ware block diagram

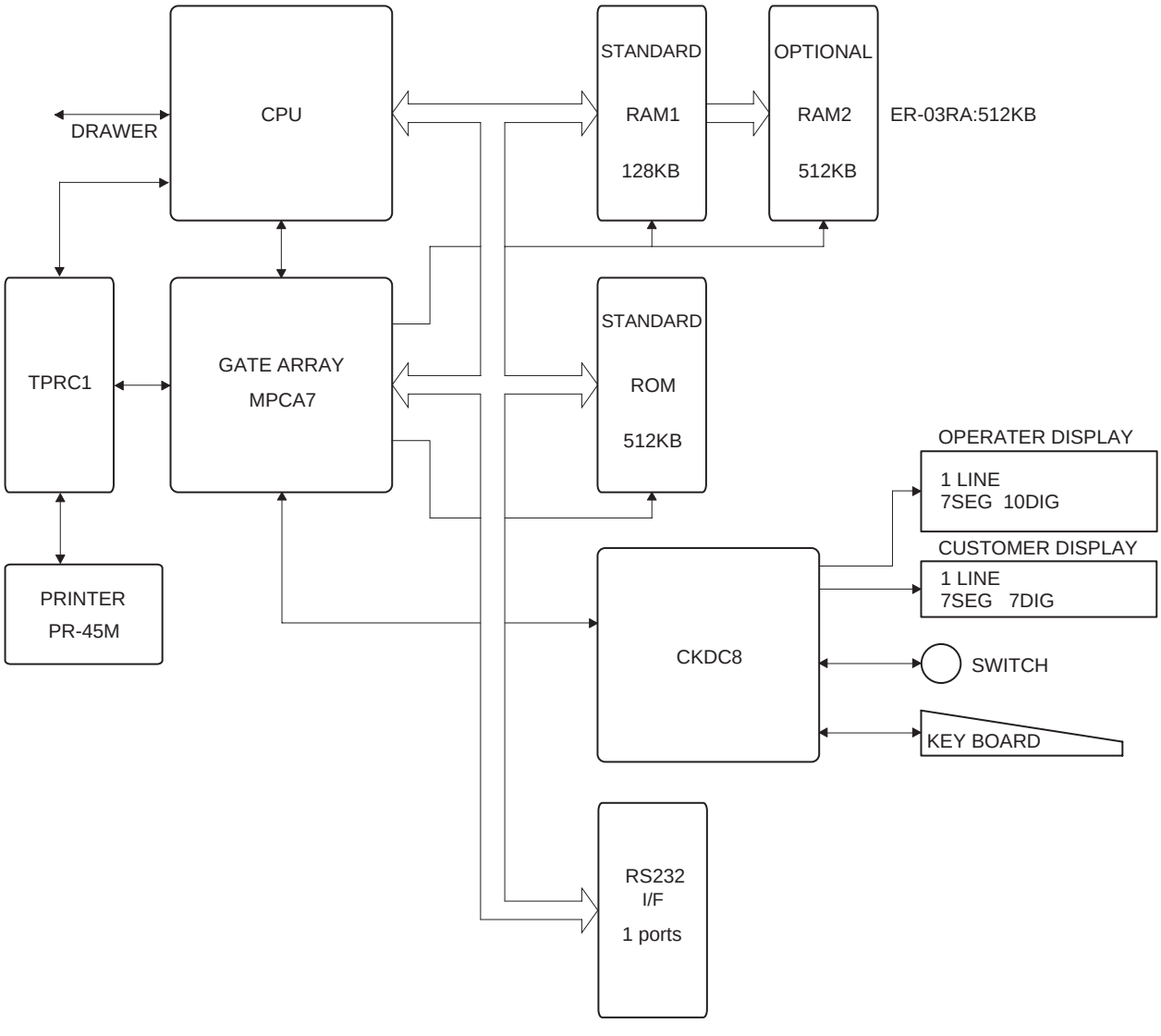
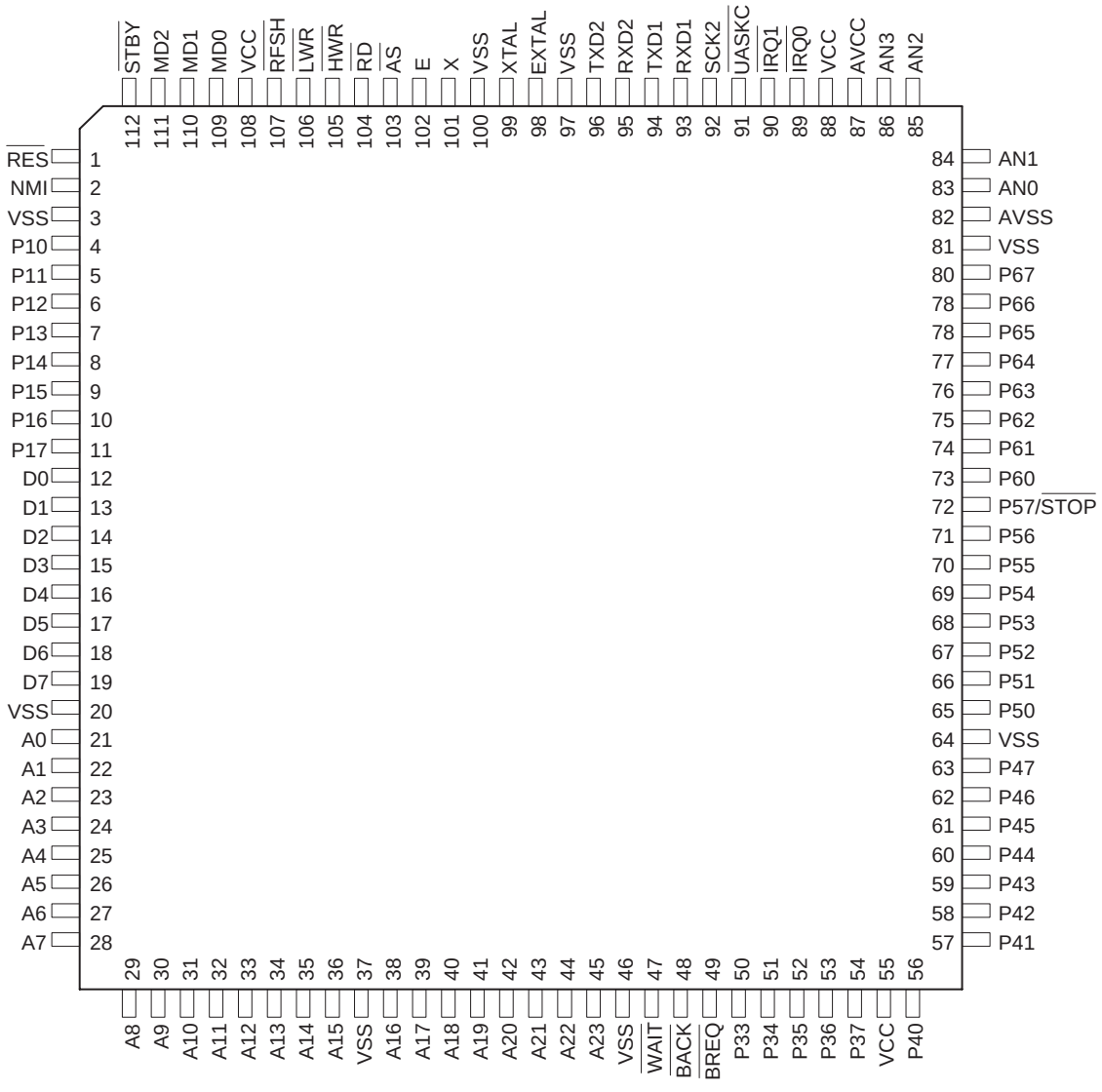


Fig. 1-1

2. Description of main LSI's

2-1. CPU (HD6415108-10)

1) Pin configuration



HD6415108-10 pin configuration

Fig. 2-1

2) Block diagram

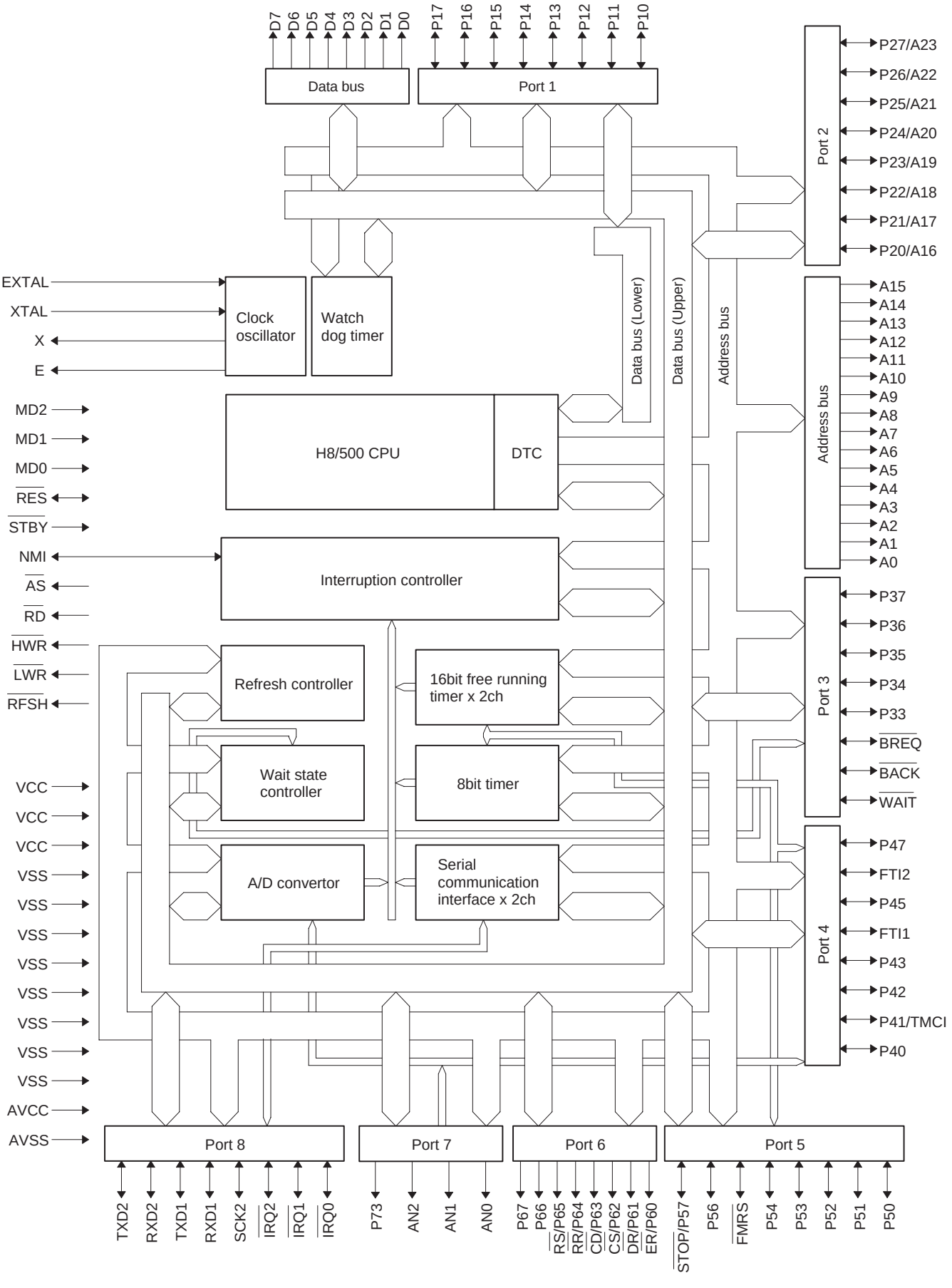


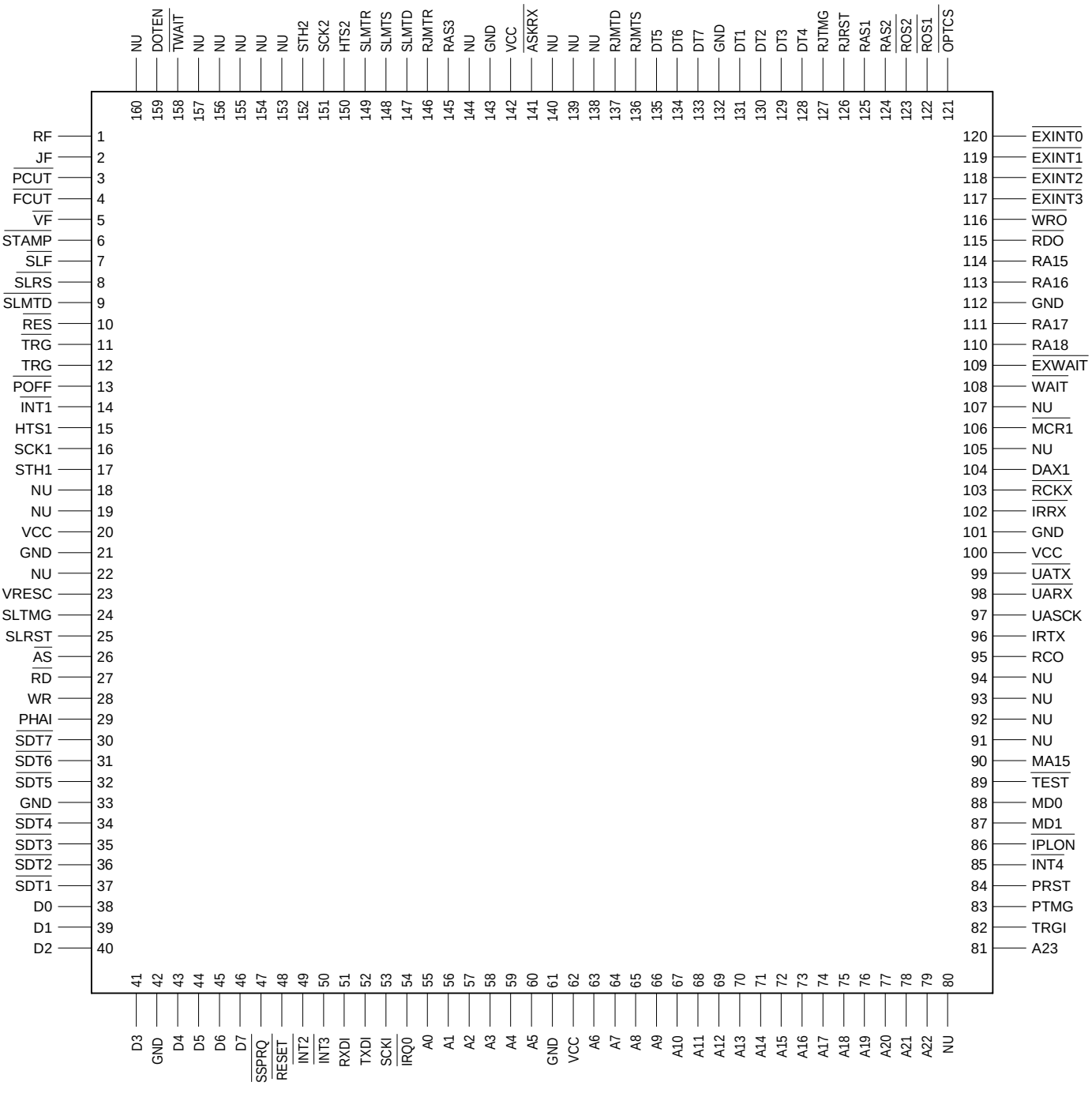
Fig. 2-2

3) Pin description

PIN No.	SYMBOL	SIGNAL NAME	IN/ OUT	FUNCTION
1	/RES	/RESET	IN	RESET INPUT from CKDC WUTH BUFFER
2	NMi	NMi	IN	NON-MASKABLE INTERRUPT INPUT FOR SSP INTERRUPT INPUT
3	VSS	VSS		GND
4	P10	ERC	OUT	EVENT READ CANCEL (to CKDC)
5	P11	LDRQ	OUT	LOAD REQUEST (to CKDC)
6	P12	/SHEN	IN	SHIFT ENABLE (from CKDC)
7	P13	/FRES	OUT	FISCAL MEMORY RESET (Nu)
8	P14	BUSY	IN	FISCAL MEMORY BUSY (Nu)
9	P15	/RDY	IN	FISCAL MEMORY READY (Nu)
10	P16	PDS	IN	POP-UP DISPLAY SENSOR (Nu)
11	P17		IN	GND
12	D0	D0	I/O	DATA BUS 0
13	D1	D1	I/O	DATA BUS 1
14	D2	D2	I/O	DATA BUS 2
15	D3	D3	I/O	DATA BUS 3
16	D4	D4	I/O	DATA BUS 4
17	D5	D5	I/O	DATA BUS 5
18	D6	D6	I/O	DATA BUS 6
19	D7	D7	I/O	DATA BUS 7
20	VSS	VSS		GND
21	A0	A0	OUT	ADDRESS BUS 0
22	A1	A1	OUT	ADDRESS BUS 1
23	A2	A2	OUT	ADDRESS BUS 2
24	A3	A3	OUT	ADDRESS BUS 3
25	A4	A4	OUT	ADDRESS BUS 4
26	A5	A5	OUT	ADDRESS BUS 5
27	A6	A6	OUT	ADDRESS BUS 6
28	A7	A7	OUT	ADDRESS BUS 7
29	A8	A8	OUT	ADDRESS BUS 8
30	A9	A9	OUT	ADDRESS BUS 9
31	A10	A10	OUT	ADDRESS BUS 10
32	A11	A11	OUT	ADDRESS BUS 11
33	A12	A12	OUT	ADDRESS BUS 12
34	A13	A13	OUT	ADDRESS BUS 13
35	A14	A14	OUT	ADDRESS BUS 14
36	A15	A15	OUT	ADDRESS BUS 15
37	VSS	VSS		GND
38	A16	A16	OUT	ADDRESS BUS 16
39	A17	A17	OUT	ADDRESS BUS 17
40	A18	A18	OUT	ADDRESS BUS 18
41	A19	A19	OUT	ADDRESS BUS 19
42	A20	A20	OUT	ADDRESS BUS 20
43	A21	A21	OUT	ADDRESS BUS 21
44	A22	A22	OUT	ADDRESS BUS 22
45	A23	A23	OUT	ADDRESS BUS 23
46	VSS	VSS		GND
47	/WAIT	/WAIT	IN	Wait signal from MPCA
48	/BACK	/BACK	OUT	Bus control request acknowl edge
49	/BREQ	/BREQ	IN	Bus control request
50	P33	DOPS	IN	Drawer open sencer signal
51	P34	/DR0	OUT	Drawer open drive signal
52	P35	/DR1	OUT	Option drawer 1 drive signal
53	P36	NU	IN	(Nu) GND
54	P37	NU	IN	(Nu) GND
55	VCC	VCC		+5V
56	P40	/IFV	IN	(Nu) pull-up
57	P41	/PTMG	IN	Printer (PR-45) timing signal from MPCA
58	P42	/TOF	IN	(Nu) pull-up
59	P43	/BOF	IN	(Nu) pull-up
60	P44	/PRST	IN	Printer (PR-45) Reset signal from MPCA
61	P45	/NEJ	IN	Near END signal jounal
62	P46	NU	IN	(NU) GND
63	P47	/NER	IN	Near END signal receipt
64	VSS	VSS		GND
65	P50	TRG1	OUT	Nu (GND)
66	P51	/PSTOP	OUT	Nu (GND)
67	P52	/CKDCR2	OUT	Nu (GND)
68	P53	OPDS	IN	Nu (GND)
69	P54	FVPON	OUT	Nu (GND)
70	P55	FMRS	IN	Nu (GND)
71	P56	/SLIPLMP	OUT	Nu (GND)
72	P57	/STOP	OUT	Nu (GND)
73	P60	/ERS	OUT	ER signal for RS232 (Equipment Ready)
74	P61	/DRS	IN	DR signal for RS232 (Data set Ready)
75	P62	/CSS	IN	CS signal for RS232 (Clear to Send)
76	P63	/CDS	IN	CD signal for RS232 (Carrier Detect)
77	P64	/RR	OUT	RR signal for RS232 (Ready to Receive) (Nu)
78	P65	/RSS	OUT	RS signal for RS232 (Request to Send)
79	P66	(/RI), /CI	IN	CI signal for RS232 (Calling Indicator)
80	P67	HP	IN	Nu (GND)
81	VSS	VSS		GND
82	AVSS	AVSS	IN	GND
83	AN0	Vrf	IN	Vrf
84	AN1	VHTEST	IN	VH Test input
85	AN2	VPTEST	IN	+24V test input
86	AN3	TM	IN	Thermal head thermistor level test
87	AVCC	AVCC	IN	+5V
88	VCC	VCC		+5V
89	P80	/iRQ0	IN	Interrupt signal 0 from MPCA
90	P81	/iRQ1 (/RSRQ)	IN	Interrupt signal from OPTION PWB
91	P82	/iRQ2	IN	Interrupt signal (Nu) pull-up
92	P83	SCK2	OUT	CKDC & FMC i/F sync shift clock
93	P84	RXD	IN	RS232C RECEIVE DATA
94	P85	TXD	OUT	RS232C SEND DATA
95	P86	RXD2	IN	CKDC, Fiscal memory unit I/F shift input data
96	P87	TXD2	OUT	CKDC, Fiscal memory unit I/F shift output data
97	VSS	VSS		GND
98	EXTAL	EXTAL	IN	X-TAL (19.66MHz)
99	XTAL	XTAL	IN	X-TAL (19.66MHz)
100	VSS	VSS		GND
101	ϕ	ϕ	OUT	System clock (9.83MHz)
102	E		OUT	E clock (NU)
103	/AS	/AS	OUT	Address strobe
104	/RD	/RD	OUT	Read
105	/HWR	/WR	OUT	Write
106	/LWR		OUT	Nu
107	/RFSH	/RFSH	OUT	Refresh cycle (NU)
108	VCC	VCC		+5V
109	MD0	MD0	IN	+5V (MODE 3)
110	MD1	MD1	IN	+5V (MODE 3)
111	MD2	MD2	IN	GND (MODE 3)
112	/STBY	/STBY	IN	+5V (Nu)

2-2. G.A (MPCA7)

1) Pin configuration



GATE ARRAY (LZ9AH39)
MPCA7

Fig. 2-3

2) Block diagram

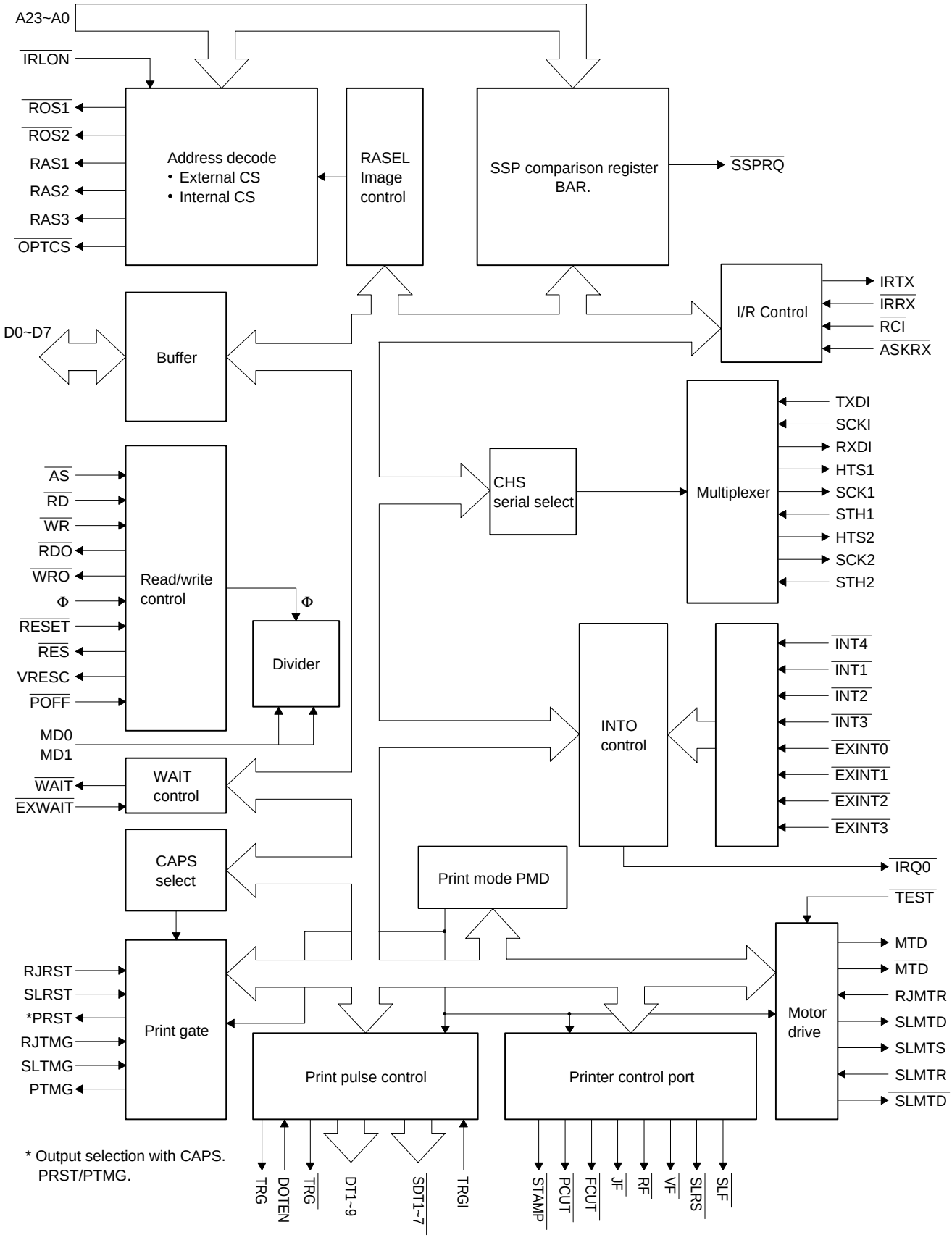


Fig. 2-4

3) Pin description

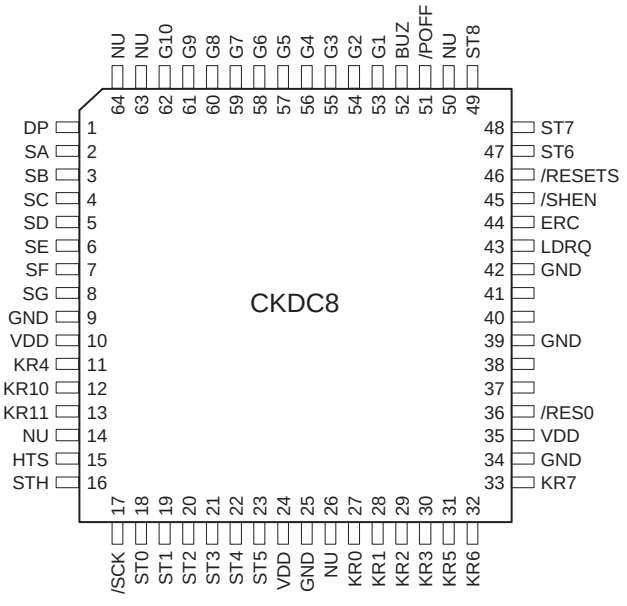
Pin No.	Signal name	In/ Out	Function
1	RF	Out	Receipt side paper feed solenoid (NU)
2	JF	Out	Journal side paper feed solenoid (NU)
3	$\overline{\text{PCUT}}$	Out	Printer partial cut signal (NU)
4	$\overline{\text{FCUT}}$	Out	Printer auto cut signal (NU)
5	$\overline{\text{VF}}$	Out	Multi line validation paper feed (NU)
6	$\overline{\text{STAMP}}$	Out	Printer stamp signal (NU)
7	$\overline{\text{SLFS}}$	Out	Slip printer paper feed singnal (NU)
8	$\overline{\text{SLRS}}$	Out	Slip printer release signal (NU)
9	$\overline{\text{SLMTD}}$	Out	Slip printer motor drive signal (NU)
10	$\overline{\text{RES}}$	Out	Peripheral output reset
11	$\overline{\text{TRG}}$	Out	Dot head trigger signal (NU)
12	TRG	Out	Dot head trigger signal (NU)
13	$\overline{\text{POFF}}$	In	Power off signal input
14	$\overline{\text{INT1}}$	In	(NU)
15	HTS1	Out	8 bit serial port output (for CKDC8)
16	SCK1	Out	Serial port shift clock output (for CKDC8)
17	STH1	In	8 bit serial port input (for CKDC8)
18	RAS VZ	—	Chip select (NU)
19	—	—	Nu
20	VCC	—	+5V
21	GND	—	GND
22	INTMCR	—	Interrupt (NU)
23	VRESC	Out	Turns active when reset and power down is met
24	SLTMG	In	Slip printer timing signal (NU)
25	SLRST	In	Slip printer reset signal (NU)
26	$\overline{\text{AS}}$	In	Address strobe
27	$\overline{\text{RD}}$	In	Read strobe
28	$\overline{\text{WR}}$	In	Write strobe
29	ϕ	In	(ϕ) System clock (9.83 MHz)
30	$\overline{\text{SDT7}}$	Out	Slip printer printhead drive signal (dot7) (NU)
31	$\overline{\text{SDT6}}$	Out	Slip printer printhead drive signal (dot6) (NU)
32	$\overline{\text{SDT5}}$	Out	Slip printer printhead drive signal (dot5) (NU)
33	GND	—	GND
34	$\overline{\text{SDT4}}$	Out	Slip printer printhead drive signal (dot4) (NU)
35	$\overline{\text{SDT3}}$	Out	Slip printer printhead drive signal (dot3) (NU)
36	$\overline{\text{SDT2}}$	Out	Slip printer printhead drive signal (dot2) (NU)
37	$\overline{\text{SDT1}}$	Out	Slip printer printhead drive signal (dot1) (NU)
38	D0	I/O	Data bus 0
39	D1	I/O	Data bus 1
40	D2	I/O	Data bus 2
41	D3	I/O	Data bus 3
42	GND	—	GND
43	D4	I/O	Data bus 4
44	D5	I/O	Data bus 5
45	D6	I/O	Data bus 6
46	D7	I/O	Data bus 7
47	$\overline{\text{SPRQ}}$	Out	SSP interrupt request to CPU
48	$\overline{\text{RESET}}$	In	MPCA reset
49	$\overline{\text{SHEN}}$	In	Shift enable from CKDC8
50	$\overline{\text{INT3}}$	In	Interrupt signal (Nu)

Pin No.	Signal name	In/ Out	Function
51	RXD2	Out	8 bit serial port output to CPU
52	TXD2	In	8 bit serial port input from CPU
53	SCK2	In	Serial port shift clock input from CPU.
54	$\overline{\text{IRQ0}}$	Out	Interrupt request to CPU
55	A0	In	Address bus 0
56	A1	In	Address bus 1
57	A2	In	Address bus 2
58	A3	In	Address bus 3
59	A4	In	Address bus 4
60	A5	In	Address bus 5
61	GND	—	GND
62	VCC	—	+5V
63	A6	In	Address bus 6
64	A7	In	Address bus 7
65	A8	In	Address bus 8
66	A9	In	Address bus 9
67	A10	In	Address bus 10
68	A11	In	Address bus 11
69	A12	In	Address bus 12
70	A13	In	Address bus 13
71	A14	In	Address bus 14
72	A15	In	Address bus 15
73	A16	In	Address bus 16
74	A17	In	Address bus 17
75	A18	In	Address bus 18
76	A19	In	Address bus 19
77	A20	In	Address bus 20
78	A21	In	Address bus 21
79	A22	In	Address bus 22
80	$\overline{\text{LCDC}}$	—	LCD CS (NU)
81	A23	In	Address bus 23
82	TRGI	In	Dot pulse control/drive signal (NU: GND)
83	$\overline{\text{PTMG}}$	Out	Printer timing signal to CPU
84	$\overline{\text{PRST}}$	Out	Printer reset signal to CPU
85	$\overline{\text{RDY}}$	In	Ready from FMC unit
86	$\overline{\text{IPLON}}$	In	To option connector (NU) +5V
87	MD1	In	Mode select input (GND)
88	MD0	In	Mode select input (GND)
89	$\overline{\text{TEST}}$	In	+5V
90	MA15	—	Image address 15
91	MA18	—	Nu
92	MA19	—	Nu
93	RCVRDY1	—	Nu: +5V
94	RCVRDY2	—	Nu: +5V
95	RC0	—	Remote control encord signal for CPU (NU)
96	IRTX	—	I/R output for LED (NU)
97	UASCK	—	I/R serial data shift clock (NU)
98	$\overline{\text{UARX}}$	—	I/R serial data for CPU (NU)
99	$\overline{\text{UATX}}$	—	I/R serial data from CPU (NU) +5V
100	VCC	—	+5V
101	GND	—	GND
102	$\overline{\text{IRRX}}$	—	I/R input from I/R unit (NU) +5V
103	$\overline{\text{RCI}}$	—	I/R input from I/R unit (NU) +5V
104	DAX1	—	System clock (NU)
105	DAX2	—	Nu

Pin No.	Signal name	In/ Out	Function	
106	$\overline{\text{MCR1}}$	—	Nu	
107	$\overline{\text{MCR2}}$	—	Nu	
108	$\overline{\text{WAIT}}$	Out	Wait request signal	
109	$\overline{\text{EXWAIT}}$	In	External wait control input signal (NU) +5V	
110	RA18	Out	Nu	
111	RA17	Out	Nu	
112	GND	—	GND	
113	RA16	Out	Nu	
114	RA15	Out	Nu	
115	$\overline{\text{RDO}}$	Out	Expansion RD signal	Option
116	$\overline{\text{WRO}}$	Out	Expansion WR signal	
117	$\overline{\text{EXINT3}}$	In	RS232C /CD interrupt	
118	$\overline{\text{EXINT2}}$	In	Option PWB (PULL UP)	
119	$\overline{\text{EXINT1}}$	In	RS232C /CI interrupt	
120	$\overline{\text{EXINT0}}$	In	Option PWB (PULL UP)	
121	$\overline{\text{OPTCS}}$	Out	Chip select base signal for expansion option	
122	$\overline{\text{ROS1}}$	Out	ROM 1 chip select signal	
123	$\overline{\text{ROS2}}$	Out	ROM 2 chip select signal (NU)	
124	RAS2	Out	RAM 2 chip select signal	
125	RAS1	Out	RAM 1 chip select signal	
126	RJRST	In	Printer reset signal	
127	RJTMG	In	FOR TPRC (NU) +5V	
128	DT4	Out	Printer dot signal 4 (NU)	
129	DT3	Out	Printer dot signal 3 (NU)	
130	DT2	Out	Printer dot signal 2 (NU)	
131	DT1	Out	Printer dot signal 1 (NU)	
132	GND	—	GND	
133	DT7	Out	Printer dot signal 7 (NU)	
134	DT6	Out	Printer dot signal 6 (NU)	
135	DT5	Out	Printer dot signal 5 (NU)	
136	$\overline{\text{MTD}}$	Out	Printer motor $\overline{\text{drive}}$ signal (NU)	
137	MTD	Out	Printer motor drive signal (NU)	
138	DOT9	Out	Printer dot signal 9 (NU)	
139	DOT8	Out	Printer dot signal 8 (NU)	
140	SYNC	—	Nu (+5V)	
141	$\overline{\text{ASKRX}}$	—	I/R input from I/R unit (NU) Pull-up	
142	VCC	—	+5V	
143	GND	—	GND	
144	—	—	Nu	
145	RAS3	Out	Nu	
146	RJMTR	In	Printer motor lock detection signal (NU) GND	
147	SLMTD	Out	Nu	
148	SLMTS	Out	Nu	
149	SLMTR	In	GND	
150	HTS2	Out	Serial output to FMC unit	
151	SCK2	Out	Serial clock to FMC unit	
152	STH2	In	Serial input to FMC unit	
153	—	—	Nu	
154	—	—	Nu	
155	—	—	Nu	
156	—	—	Nu	
157	—	—	Nu	
158	LCDWT	IN	TPRC wait signal	
159	DOTEN	Out	Dot drive enable signal (Nu)	
160	RASP	—	Nu	

2-3. CKDC8

1) Pin configulation



2) Pin assignment (CKDC8)

Pin No.	SYMBOL	SIGNAL NAME	IN/ OUT	FUNCTION
1	DP	DP	OUT	DISPLAY SEGMENT Dp
2	A	SA	OUT	DISPLAY SEGMENT a
3	B	SB	OUT	DISPLAY SEGMENT b
4	C	SC	OUT	DISPLAY SEGMENT c
5	D	SD	OUT	DISPLAY SEGMENT d
6	E	SE	OUT	DISPLAY SEGMENT e
7	F	SF	OUT	DISPLAY SEGMENT f
8	G	SG	OUT	DISPLAY SEGMENT g
9	VSS0	GND		GND
10	VDD0	VDD		VDD
11	KR4	KR4	IN	KEY RETURN 4
12	KR10	KR10	IN	KEY RETURN (feed clerk MRS sw)
13	KR11	KR11	IN	KEY RETURN (MODE sw)
14	KR8	NU	IN	GND
15	HTS	HTS	IN	
16	STH	STH	OUT	
17	/SCK	/SCK	IN	SHIFT CLOCK
18	ST0	ST0	OUT	KEY STROBE 0
19	ST1	ST1	OUT	KEY STROBE 1
20	ST2	ST2	OUT	KEY STROBE 2
21	ST3	ST3	OUT	KEY STROBE 3
22	ST4	ST4	OUT	KEY STROBE 4
23	ST5	ST5	OUT	KEY STROBE 5
24	VDD1	VDD		VDD
25	AXSS	GND		GND
26	KR9	NU		GND
27	KR0	KR0	IN	KEY RETURN 0
28	KR1	KR1	IN	KEY RETURN 1
29	KR2	KR2	IN	KEY RETURN 2
30	KR3	KR3	IN	KEY RETURN 3
31	KR5	KR5	IN	KEY RETURN 5
32	KR6	KR6	IN	KEY RETURN 6

Pin No.	SYMBOL	SIGNAL NAME	IN/ OUT	FUNCTION
33	KR7	KR7	IN	KEY RETURN 7
34	AVRF	GND		
35	AVDD	VDD		
36	/RESET	/RES0	IN	
37	XT2			32.768 KHz
38	XT1			
39	IC	GND		
40	X2			4.19 MHz
41	X1			
42	VSS1	GND		
43	LDRQ	LDRQ	IN	LORD REQUEST
44	ERC	ERC	IN	EVENT READ CANCEL
45	SHEN	/SHEN	OUT	SHIFT ENABLE
46	/RES1	/RESETS	OUT	SYSTEM TO RESET
47	ST6	ST6	OUT	KEY STROBE 6
48	ST7	ST7	OUT	KEY STROBE 7
49	ST8	ST8	OUT	KEY STROBE 8
50	ST9	NU	OUT	KEY STROBE 9
51	/POFF	/POFF	IN	POWER OFF
52	BUZ	BUZ	OUT	BUZZER
53	T0	G1	OUT	DISPLAY DIGIT 1
54	T1	G2	OUT	DISPLAY DIGIT 2
55	T2	G3	OUT	DISPLAY DIGIT 3
56	T3	G4	OUT	DISPLAY DIGIT 4
57	T4	G5	OUT	DISPLAY DIGIT 5
58	T5	G6	OUT	DISPLAY DIGIT 6
59	T6	G7	OUT	DISPLAY DIGIT 7
60	T7	G8	OUT	DISPLAY DIGIT 8
61	T8	G9	OUT	DISPLAY DIGIT 9
62	T9	G10	OUT	DISPLAY DIGIT 10
63	T10	NU	OUT	DISPLAY DIGIT 11
64	ID	NU	OUT	DISPLAY SEGMENT c

2-4. TPRC1 (F258024PC)

1) General

TPRC1 is the LSI circuit of the peripheral circuits of the microcomputer required for thermal printer control.

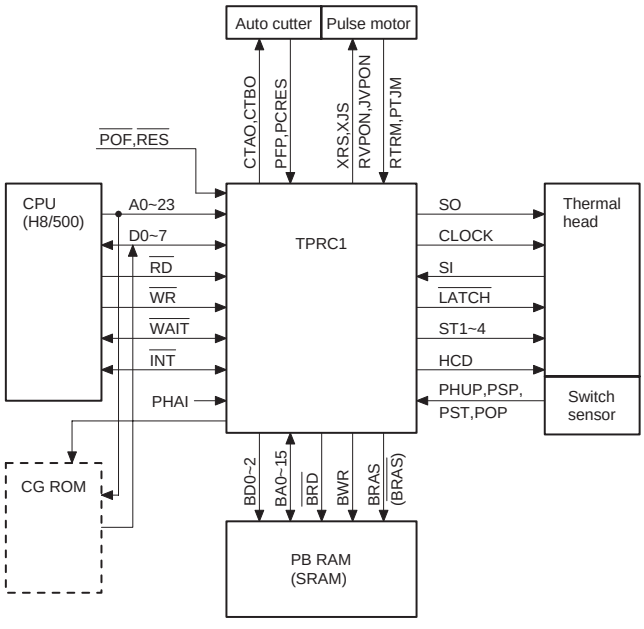


Fig. 2-6

The CPU is designed for use with H8/500. The bus I/F, however, is not restricted to the design concept.

The printer is designed mainly for use with PR-58. However, the thermalhead composition (the dot number and the block number) is rather flexible.

1. Auto cutter (Option)
2. Pulse motor
3. Thermalhead
4. Switch

2) Pin configuration

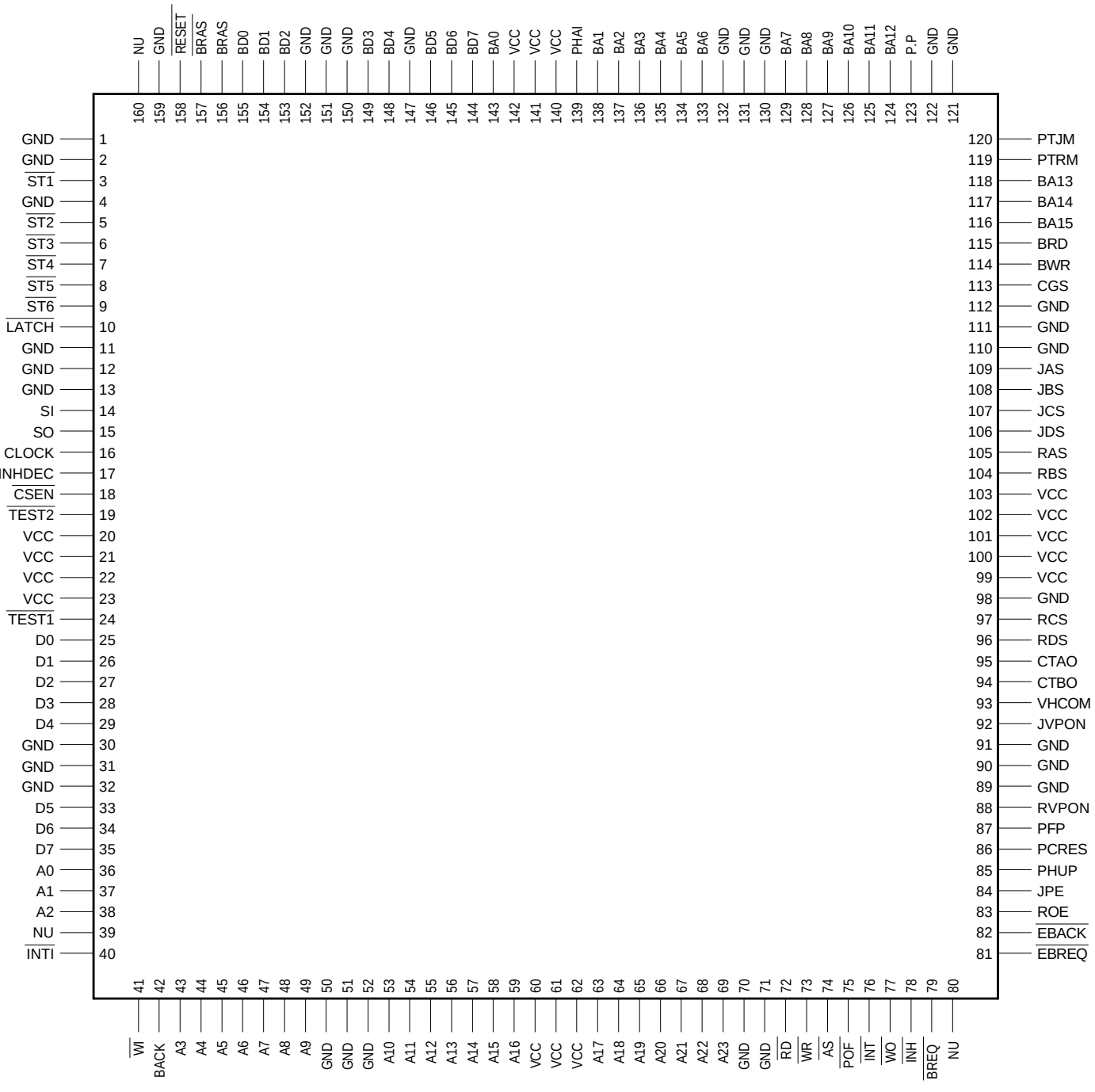
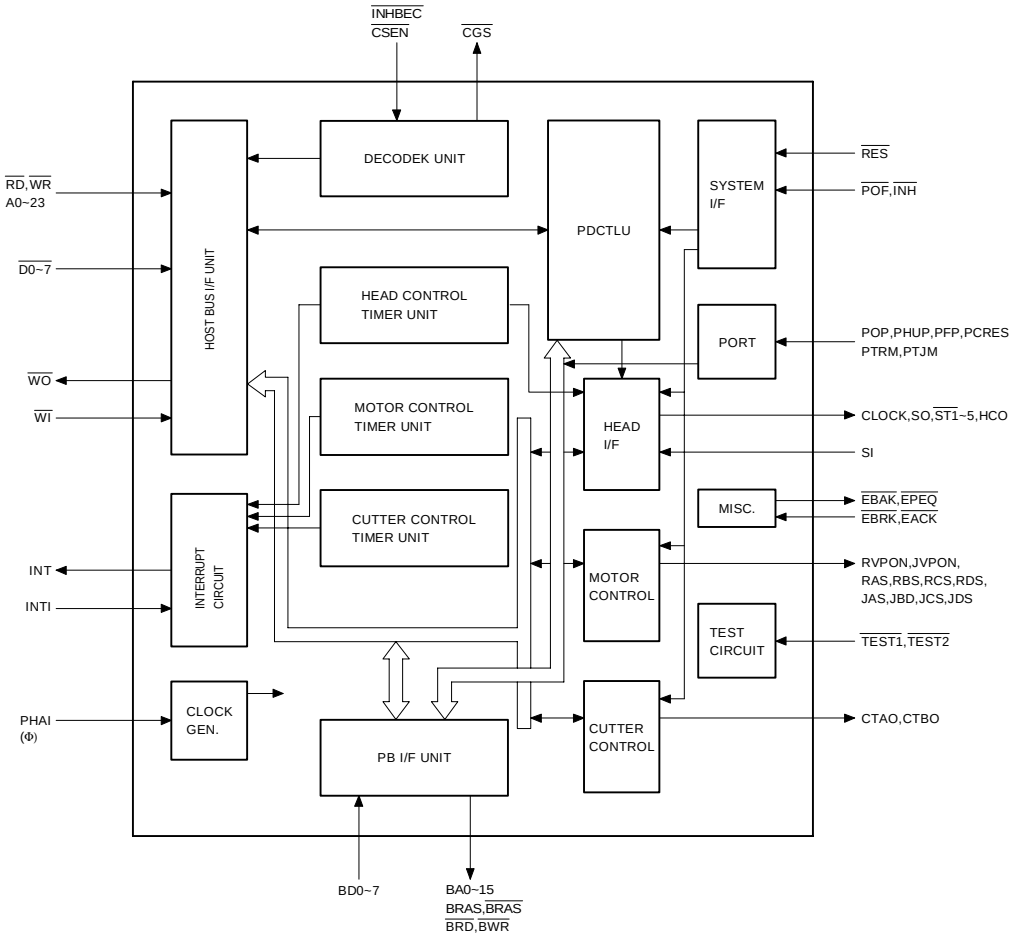


Fig. 2-7

3) Block diagram



TPRC1 BLOCK DIAGRAM

Fig. 2-8

4) Pin description

Pin No.	Signal name	In/Out	Function
1	GND	—	GND
2	GND	—	GND
3	ST1	O	Head drive strobe signal 1
4	GND	—	GND
5	ST2	O	Head drive strobe signal 2
6	ST3	O	Head drive strobe signal 3
7	ST4	O	Head drive strobe signal 4
8	ST5	O	NU
9	ST6	O	NU
10	LATCH	O	Head latch signal
11	GND	—	GND
12	GND	—	GND
13	GND	—	GND
14	SI	I	Data return line, thermalhead -- TPRC1
15	SO	O	Send data from TPRC1 to thermalhead Data from PB-RAM or zero data are outputted at the falling of CLOCK signal. 16
16	CLOCK	O	Thermalhead CLOCK signal SO is outputted at the edge of I Ä O, and is taken at the edge of o Ä I.

Pin No.	Signal name	In/Out	Function
17	INHDEC	I	GND
18	CSEN	I	GND
19	TEST2	I	+5V internal counter timer test pin
20	Vcc	—	+5V
21	Vcc	—	+5V
22	Vcc	—	+5V
23	Vcc	—	+5V
24	TEST1	I	+5V internal counter timer test pin
25	D0	I/O	Data bus 0: Internal register, print buffer data IO
26	D1	I/O	Data bus 1: Internal register, print buffer data IO
27	D2	I/O	Data bus 2: Internal register, print buffer data IO
28	D3	I/O	DAta bus 3: Internal register, print buffer data IO
29	D4	I/O	Data bus 4: Internal register, print buffer data IO
30	GND	—	GND
31	GND	—	GND
32	GND	—	GND

Pin No.	Signal name	In/Out	Function
33	D5	I/O	Data bus 5: Internal register, print buffer data IO
34	D6	I/O	Data bus 6: Internal register, print buffer data IO
35	D7	I/O	Data bus 7: Internal register, print buffer data IO
36	A0	I	Address bus 0
37	A1	I	Address bus 1
38	A2	I	Address bus 2
39	TPRCRQ2	—	Request signal
40	$\overline{\text{INTI}}$	I	+5V
41	$\overline{\text{WI}}$	I	+5V
42	$\overline{\text{BACK}}$	I	$\overline{\text{BACK}}$
43	A3	I	Address bus 3
44	A4	I	Address bus 4
45	A5	I	Address bus 5
46	A6	I	Address bus 6
47	A7	I	Address bus 7
48	A8	I	Address bus 8
49	A9	I	Address bus 9
50	GND	—	GND
51	GND	—	GND
52	GND	—	GND
53	A10	I	Address bus 10
54	A11	I	Address bus 11
55	A12	I	Address bus 12
56	A13	I	Address bus 13
57	A14	I	Address bus 14
58	A15	I	Address bus 15
59	A16	I	Address bus 16
60	Vcc	—	+5V
61	Vcc	—	+5V
62	Vcc	—	+5V
63	A17	I	Address bus 17
64	A18	I	Address bus 18
65	A19	I	Address bus 19
66	A20	I	Address bus 20
67	A21	I	Address bus 21
68	A22	I	Address bus 22
69	A23	I	Address bus 23
70	GND	—	GND
71	GND	—	GND
72	$\overline{\text{RD}}$	I	Read strobe signal: Gate enable of data bus D0 - D7 tri-state buffer
73	$\overline{\text{WR}}$	I	Write strobe signal: Write enable into the internal register and the print buffer.
74	$\overline{\text{AS}}$	I	$\overline{\text{AS}}$
75	$\overline{\text{POF}}$	I	Power off signal
76	$\overline{\text{INT}}$	O	Interrupt signal
77	$\overline{\text{WO}}$	O	Wait request signal to the CPU
78	$\overline{\text{INH}}$	I	Head drive inhibit
79	$\overline{\text{BREQ}}$	O	Bus request to CPU
80	—	—	NU
81	$\overline{\text{EBREQ}}$	I	Bus request from option

Pin No.	Signal name	In/Out	Function
82	$\overline{\text{EBACK}}$	O	Bus acknolege to option
83	RPE	I	Receipt paper empty
84	JPE	I	Journal paper empty
85	PHUP	I	Printer head up
86	PCRES	I	Auto cutter unit reset signal input (Nu)
87	PFP	I	Auto cutter unit FP signal input (Nu)
88	RVPON	O	Receipt side paper feed pulse motor common power control signal (Nu)
89	GND	—	GND
90	GND	—	GND
91	GND	—	GND
92	JVPON	O	Journal side paper feed pulse motor common power control signal (Nu)
93	VHCOM	O	Head drive common power control
94	CTBO	O	Cutter motor control signal (Nu)
95	CTAO	O	Cutter motor control signal (Nu)
96	RDS	O	Receipt side paper feed pulse motor drive signal, phase D
97	RCS	O	Receipt side paper feed pulse motor drive signal, phase C
98	GND	—	+5V
99	Vcc	—	+5V
100	Vcc	—	+5V
101	Vcc	—	+5V
102	Vcc	—	+5V
103	Vcc	—	+5V
104	RBS	O	Receipt side paper feed pulse motor drive signal, phase B
105	RAS	O	Receipt side paper feed pulse motor drive signal, phase A
106	JDS	O	Journal side paper feed pulse motor drive signal, phase D
107	JCS	O	Journal side paper feed pulse motor drive signal, phase C
108	JBS	O	Journal side paper feed pulse motor drive signal, phase B
109	JAS	O	Journal side paper feed pulse motor drive signal, phase A
110	GND	—	GND
111	GND	—	GND
112	GND	—	GND
113	CGS	O	NU
114	$\overline{\text{BWR}}$	O	PB-RAM write strobe signal
115	$\overline{\text{BRD}}$	O	PB-RAM read strobe signal
116	BA15	O	NU
117	BA14	O	Address 14 for PB-RAM
118	BA13	O	Address 13 for PB-RAM
119	PTRM	I	Receipt motor connector sens signal
120	PTJM	I	Journal motor connector sens signal
121	GND	—	GND
122	GND	—	GND
123	POPI	O	GND
124	BA12	O	Address bus 12 for PB-RAM
125	BA11	O	Address bus 11 for PB-RAM
126	BA10	O	Address bus 10 for PB-RAM

Pin No.	Signal name	In/Out	Function
127	BA9	O	Address bus 9 for PB-RAM
128	BA8	O	Address bus 8 for PB-RAM
129	BA7	O	Address bus 7 for PB-RAM
130	GND	—	GND
131	GND	—	GND
132	GND	—	GND
133	BA6	O	Address bus 6 for PB-RAM
134	BA5	O	Address bus 5 for PB-RAM
135	BA4	O	Address bus 4 for PB-RAM
136	BA3	O	Address bus 3 for PB-RAM
137	BA2	O	Address bus 2 for PB-RAM
138	BA1	O	Address bus 1 for PB-RAM
139	PHAI	I	TPRC1 clock input pin (9.83 MHz)
140	Vcc	—	+5V
141	Vcc	—	+5V
142	Vcc	—	+5V
143	BA0	O	Address bus 0 for PB-RAM
144	BD7	I/O	Data bus 7 for PB-RAM
145	BD6	I/O	Data bus 6 for PB-RAM
146	BD5	I/O	Data bus 5 for PB-RAM
147	GND	—	GND
148	BD4	I/O	Data bus 4 for PB-RAM
149	BD3	I/O	Data bus 3 for PB-RAM
150	GND	—	GND
151	GND	—	GND
152	GND	—	GND
153	BD2	I/O	Data bus 2 for PB-RAM
154	BD1	I/O	Data bus 1 for PB-RAM
155	BD0	I/O	Data bus 0 for PB-RAM
156	BRAS	O	PB-RAM chip select: Active HIGH (Nu)
157	$\overline{\text{BRAS}}$	O	PB-RAM chip select: Active LOW
158	$\overline{\text{RESET}}$	I	TPRC1 reset signal
159	GND	—	GND
160	NU	—	GND

3. Clock generator

1) CPU (HD64151010FX)

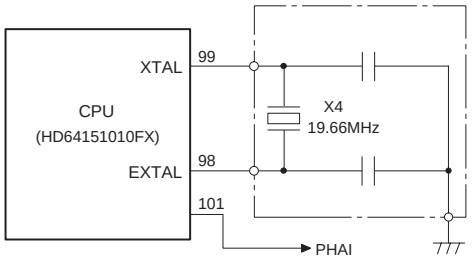


Fig. 3-1

Basic clock is supplied from a 19.66 MHz ceramic oscillator.
The CPU contains an oscillation circuit from which the basic clock is internally driven. If the CPU was not operating properly, the signal does not appear on this line in most cases.

2) CKDC8 oscillation circuit

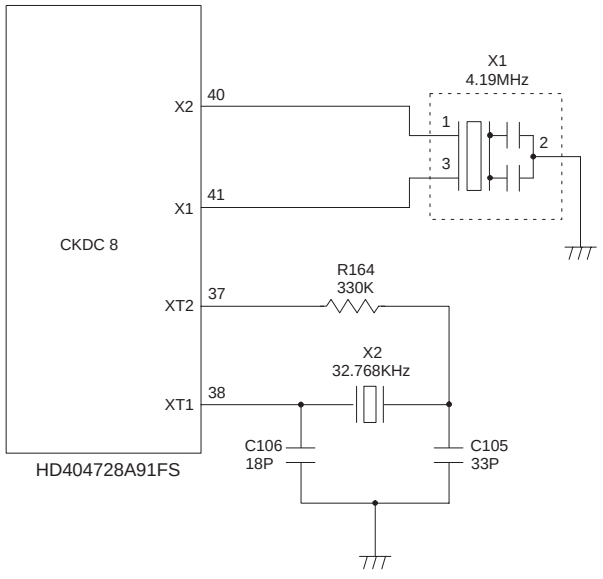


Fig. 3-2

Two oscillators are connected to the CKDC8.
The main clock X1 generates 4.19MHz which is used during power on. When power is turned off, the CKDC8 goes into the standby mode and the main clock stops.
The sub-clock X2 generates 32.768KHz which is primarily used to update the internal RTC (real time clock). During the standby mode, it keeps oscillating to update the clock and monitoring the power recovery.

4. Reset (POFF) circuit

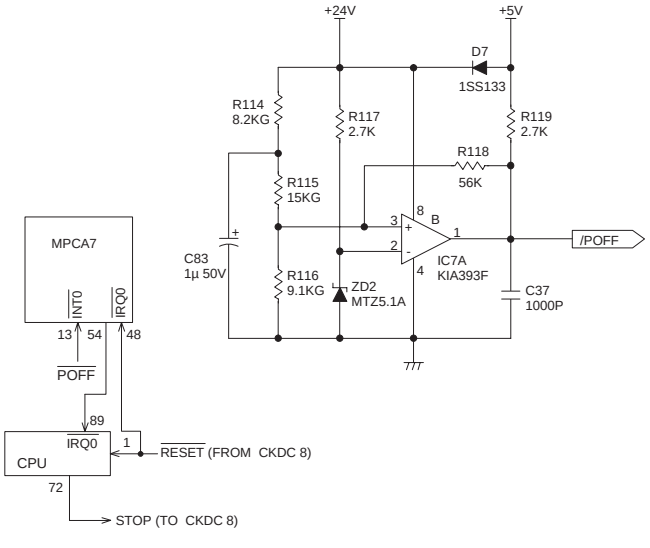
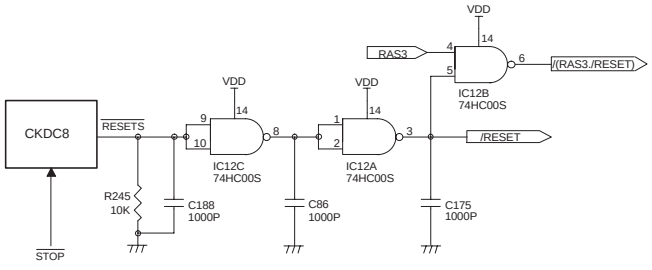


Fig. 4-1

In order to prevent memory loss at a time of power off and power supply failure of the ECR, the power supply condition is monitored at all times. When a power failure is met, the CPU suspends the execution of the current program and immediately executes the power-off program to save the data in the CPU registers in the external S-RAM with the signal $\overline{\text{STOP}}$ forced low to prepare for the power-off situation. The signal $\overline{\text{STOP}}$ is supplied to the CKDC8 as signal $\overline{\text{RESET}}$ to reset the devices.

This circuit monitors +24V supply voltage.

The voltage at the (–) pin of the comparator IC7A is always maintained to 5.1V by means of the zener diode ZD2, while +24V supply voltage is divided through the resistors R114, R115 and R116, and is applied to the (+) pin. When normal +24V is in supply, 6.8V is supplied to the (+) pin, therefore, signal $\overline{POFF}$ is at a high level. When +24V supply voltage decreases due to a power off or any other reason, the voltage at the (+) pin also decreases. When +24V supply voltage drops, the voltage at the (+) pin drops below +5.1V, which causes $\overline{POFF}$ to go low, thus predicting the power-off situation.



The $\overline{STOP}$ signal from the CPU is converted into the $\overline{RESETS}$ signal by the CKDC8.

The $\overline{RESETS}$ signal from the CKDC8 is converted into the $\overline{RESET}$ signal at the gate backed-up by the VRAM power, performing the system reset.

5. Memory control

1) Memory map

① All range memory map

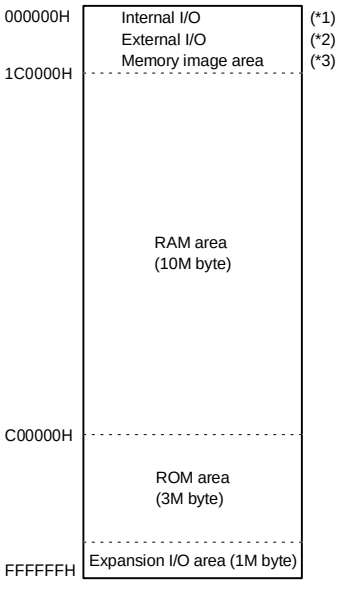


Fig. 5-1

(* 1) “Internal I/O” means the registers in the H8/510.

(* 2) “External I/O” means the base system I/O area to be addressed in page 0.

(* 3) "Memory image area" means the lower 32KB of ROM area which is projected to 000000H ~ 007FFFH for allowing reset start and other vector addressing, or the lower 32KB of ROM area which is projected to 008000H ~ 00FE7FH for allowing 0 page addressing of work RAM area.

(* 4) “Expansion I/O” means expansion I/O device area which isaddressed to area other than page 0.

② 0 page memory map

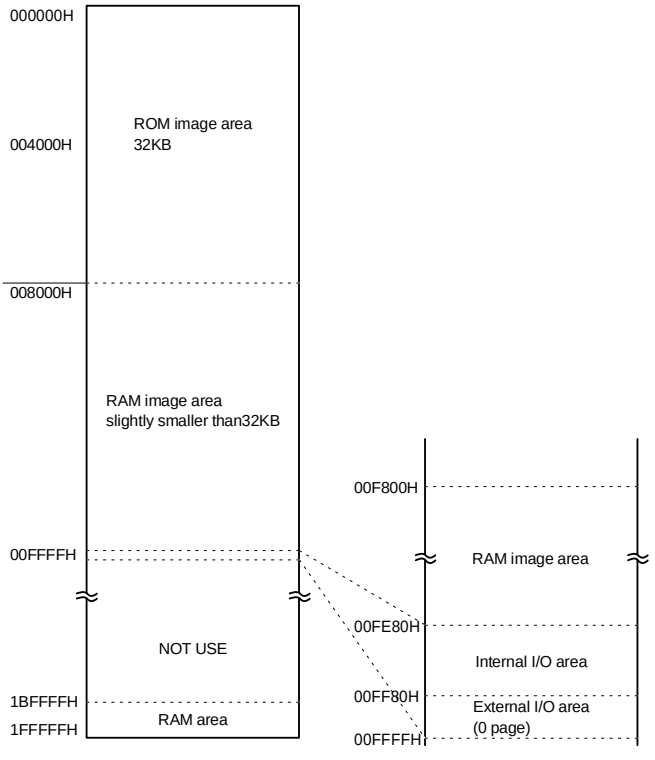


Fig. 5-2

- ROM image area: Image is formed in ROM area address C00000H to C07FFFH. This area is identical to IPL ROM area which will beseparately developed.

- RAM image area: Image is formed in RAM area address 1F0000H to 1F7E7FH. (* Note)

  * Note: Image can be formed in lower 32KB of RAS2.

③ ROM area memory map

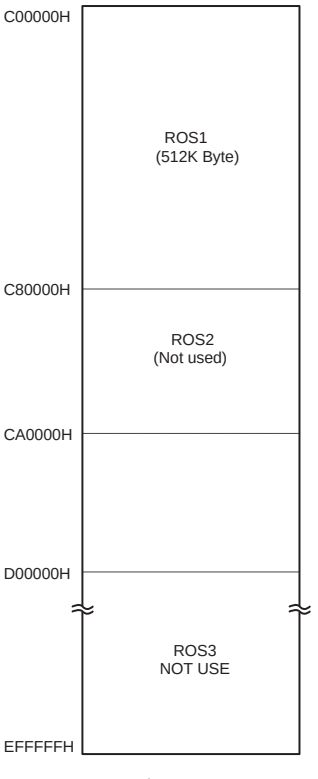


Fig. 5-3

④ RAM area memory map

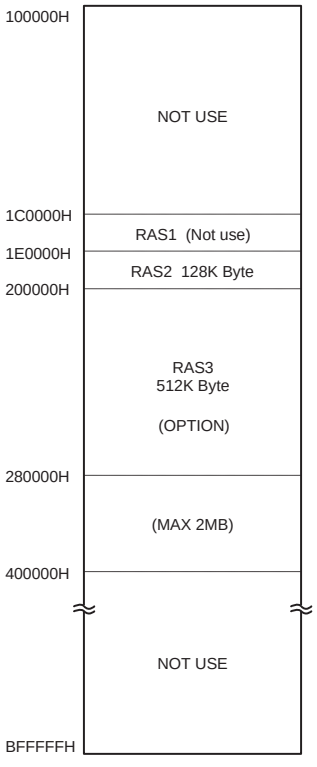


Fig. 5-4

* Note: RAS2 signal is formed as OR in the image area of 0 page. (lower32KB).

⑤ I/O area memory map

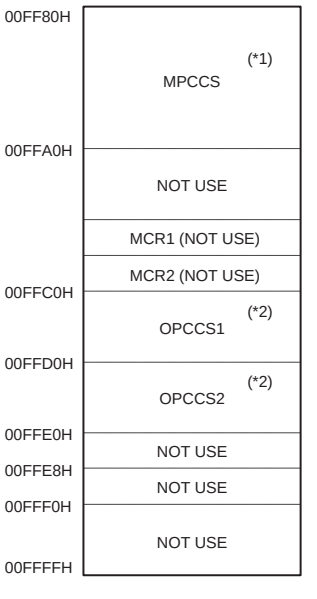


Fig. 5-5

* Note 1: MPCCS signal is the base signal for MPCA7 internal registerdecoding, and does not exist as an internal signal.

* Note 2: OPCCS1 and OPCCS2 signals are decoded in the OPC (optionperipheral controller) using the base signal OPTCS for optiondecoding. They does not exist as external signals.

2) Block diagram

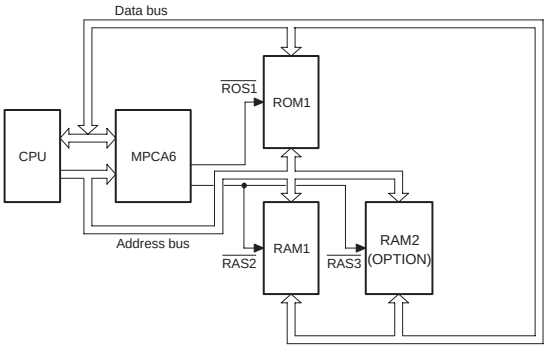


Fig. 5-6

① ROM control

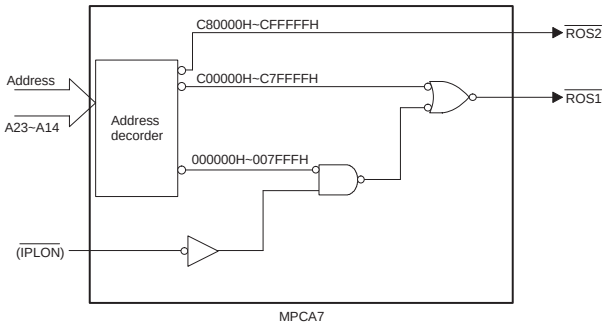


Fig. 5-7

IPLON: IPL board detection signal incorporated in the option slot. Note used in the ER-A445P. (Not used)

Access is performed with two ROM chip select signals $\overline{ROS1}$ and $\overline{ROS2}$, which decode 512KB address area respectively to accessmax. 4MB ROM.

② RAM control

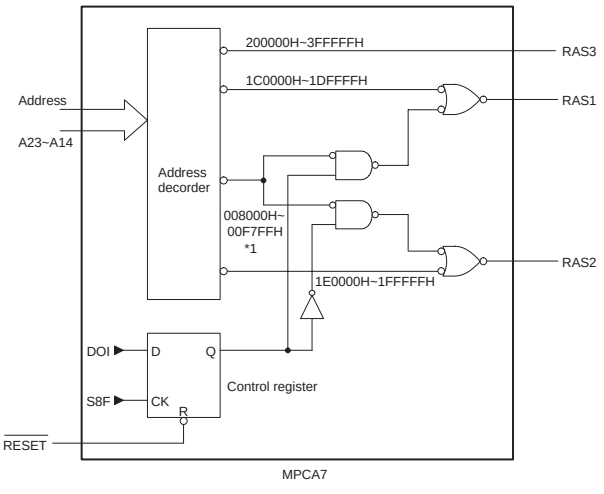


Fig. 5-8

Access is performed with two RAM chip select signals, RAS2 and RAS3. The control register in MPCA7 allows selection of pageimage memory area. (RAS1 is selected for initializing.)

* : For 0 page image area, selection between RAS2 and RAS3 can bemade with the control register. The 0 page control registerperforms initializing at the timing of no stack processimmediately after resetting.

6. SSP circuit

1) Block diagram

This is the circuit employed to do the Special Service Preset(SSP).

(Block diagram)

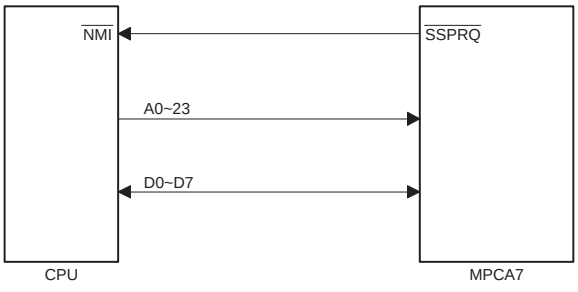


Fig. 6-1

(MPCA7 block diagram)

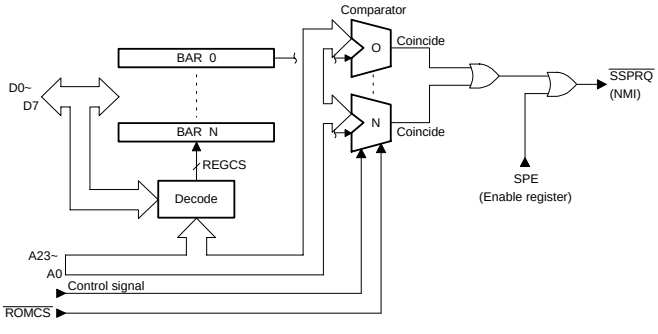


Fig. 6-2

As the address detection system, the brake address register comparison system is employed though the mapping system was employed in the conventional monitor RAM. The address registerlocated in MPCA is always compared with the system address bus to monitor and generate NMI signal at a synchronized timing and togo to NMI exception process.

In the exception process routine service routine, the entry address is checked to go to SSP sub routine.

Entry to the break address register (BAR) is performed through address FFFF00H or later decoded in MPCA7.

2) SSP register

The break address register (BAR) is accessed through direct address of FFFF00H~FFFFFFH. Entry number is 32 entry.

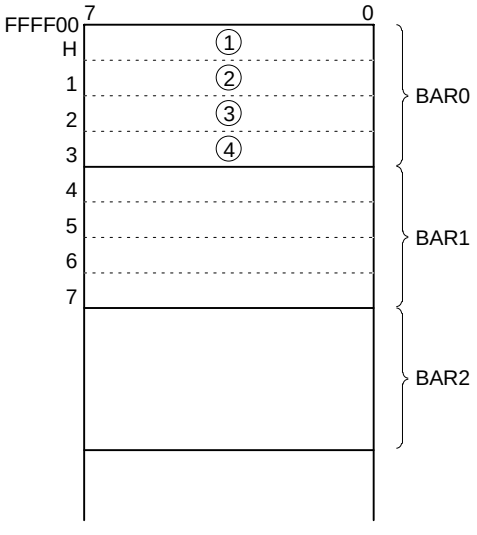
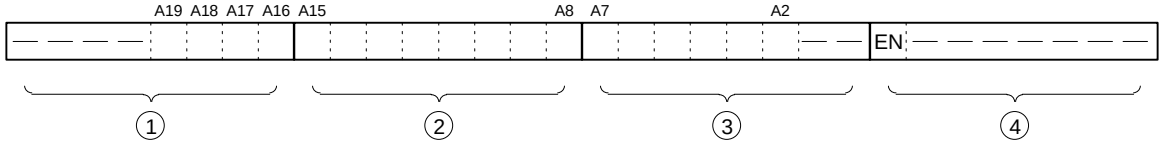


Fig. 6-3

Each BAR is composed of 4 byte address. Bit composition is as follows:



Don't care for "-----."

< BAR composition >

Fig. 6-4

④ is the enable register. The entry registers of the break address are assigned to ① , ② , and ③ . Each bit of address corresponds to each bit position, writing to ① , ② , and ③ is performed without shifting. The corresponding area is 1MB space of ROS1 and ROS2.

3) SSP register access method

Access to SSP break address register is performed through the temporary register as shown below:

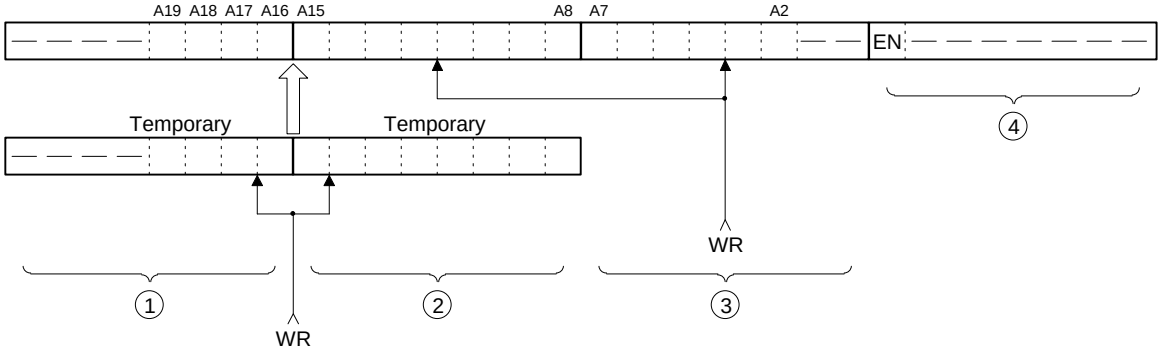


Fig. 6-5

Enable flags can be accessed individually.
Though enable register ④ can be accessed individually, writing to brake address registers ① and ② is performed at the same time as writing to brake address register ③ through the temporary register.
Therefore, set ① and ② to temporary, then write into ③ at last.
Since the temporary register is commonly used by BAR sets, thefollowing register setting is performed after completion ofsetting of each break address register.

③ SSP control method

Access to the enable register and the brake address register is only possible when writing to them from the CPU.

bit 7	6	5	4	3	2	1	0	
0	0	0	CMP4	CMP3	CMP2	CMP1	CMP0	(FFFFFFH)

Information on which brake register the SSP brake is detected in is read as binary data by reading address FFFFFFH (*1).
Used in an expanded register.
Normally is a reserve bit. Whenreading, fixed to 0.
If there are 32 break registers, binary expression is made with the above 5 bits, and 0th is "00000_B" and 31st is "11111_B."
When detected simultaneously by two or more break registers, onewith the smaller BAR number is read as binary data.
The brake signals (NMI) and the above detection data (CMP0~4) areheld until the above detection data are read. So read should bemade in the NMI sub routine. (Clear by FFFFFFH read.)

* 1: FFFFFFH is not fulldecoded. (FFFF00H~FFFFFFH). Therefore,unnecessary read access in parentheses should not be performed.

7. PRINTER control circuit

1) Block diagram

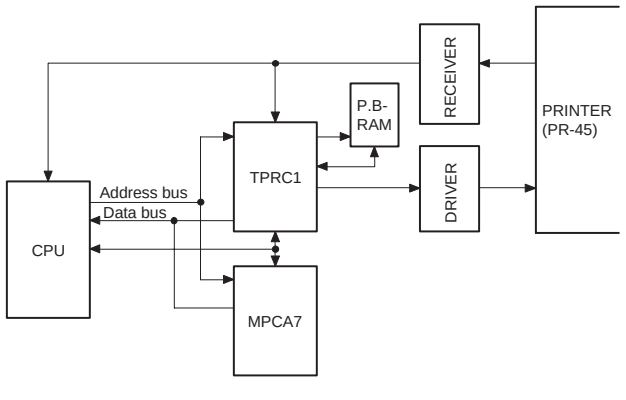
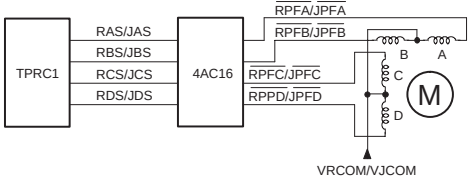


Fig. 7-1

- The thermal printer (PR-45M) is controlled by the thermal printer controller (TPRC1). The PB-RAM connected to TPRC1 serves as a print data buffer.

2) Paper feed circuit



- A pulse motor is used as the paper feed motor.
- Drive sequence of the pulse motor is as follows:

Receipt feed motor: The motor rotates counterclockwise.

Step No.	Phase			
	A	B	C	D
1	ON	OFF	ON	OFF
2	ON	OFF	OFF	ON
3	OFF	ON	OFF	ON
4	OFF	ON	ON	OFF

Journal feed motor: The motor rotates clockwise.

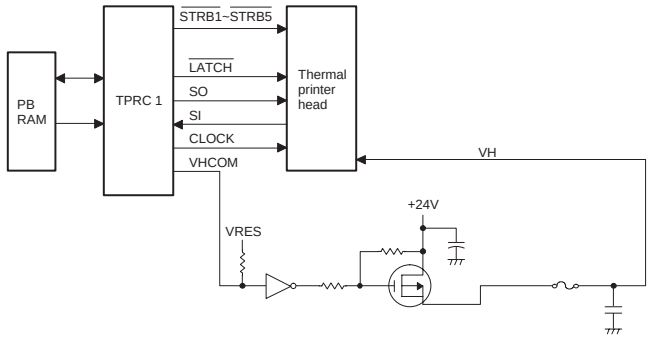
Step No.	Phase			
	A	B	C	D
1	ON	OFF	OFF	ON
2	ON	OFF	ON	OFF
3	OFF	ON	ON	OFF
4	OFF	ON	OFF	ON

Note 1: ON = Conducting
OFF = Not conducting

Note 2: Step No. is performed by the internal process of TPRC1.

- When the motor is locked, the circuit is connected to the CPU through MPCA6.

3) Print circuit



8. Drawer drive circuit

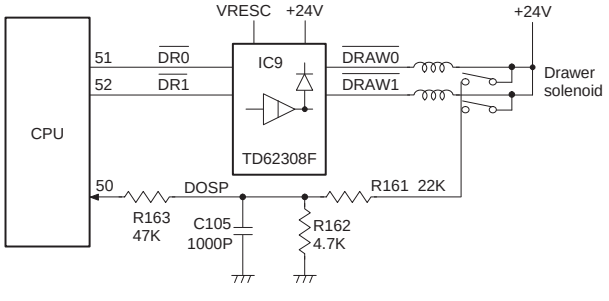


Fig. 8-1

The drawer is directly supported by the CPU. No action starts when the power supply is not steady as the output stage of the driver is pulled VP by VRESC signal.

Drawer open and close is sensed with the microswitch provided in the drawer whose signal is level converted with R161 and R162 and directly read by the CPU.

9. Key, display, time buzzer controls

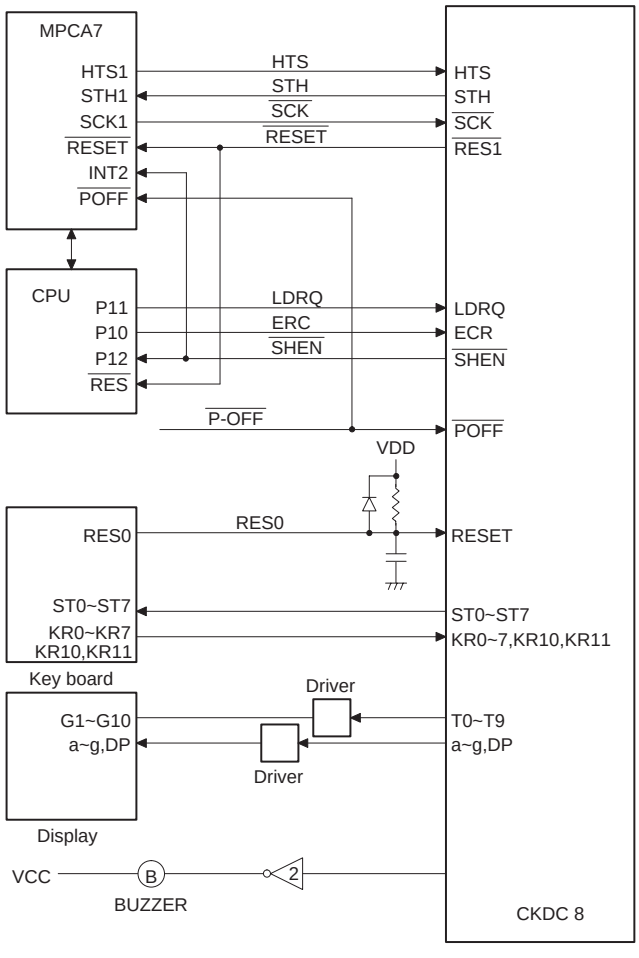


Fig. 9-1

1) Power on sequence

During service interruption, the CKDC8 senses POF within 500msec. When service interruption is cancelled by turning on the power, the CKDC8 cancels resetting of the CPU in the command mode. After initializing each port, the CPU reads the start condition (1 byte).

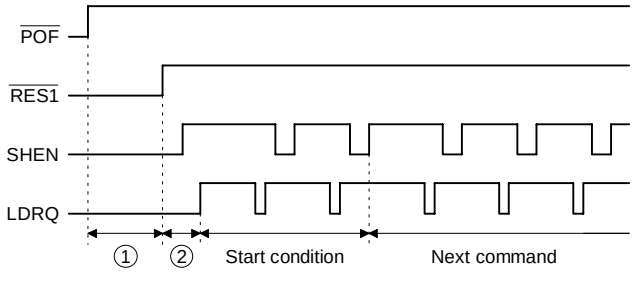


Fig. 9-2

After sampling POF High, the CKDC8 performs mode scan and key scan at ① , then cancels resetting of the CPU. After being cancelled, the CPU initializes each port at ② and reads the start condition.

After being cancelled, the CPU reads the start condition without fail to set the sift mode. If, however, the first starting is made in other than SRV mode after the CKDC8 resets the CPU without request from the CPU, the CKDC8 sets the start condition supposing that starting is made in SRV mode.

2) Power off sequence

When the CPU senses a service interruption, it performs necessary procedures for CPU stop. Then the CPU outputs a reset request to the CKDC8.

Reset request

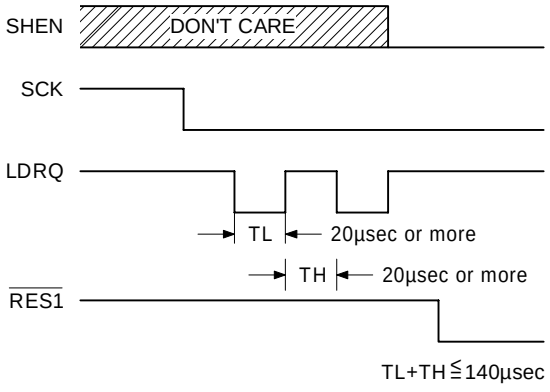


Fig. 9-3

When the CPU senses a service interruption or an error, it performs necessary procedure for CPU stop and issues reset request.

CPU procedures necessary for reset request

① All CPU interrupts are made DI.

② SCK is driven to low.

③ Keep LDRQ at LOW level for 20usec or more and drive it HIGH.

④ Loop ① to ③. During looping, access should not be made to external memory.

⑤ It should be within 140usec from rising of one LDRQ to rising of another.

When, however, the CKDC8 senses a service interruption at POF, it stops displaying. Service interruption procedure is performed after receiving reset request from the CPU. If reset request is not sent from the CPU within 100msec the service interruption procedure is started after 110 ±10msec to go into the stand-by mode.

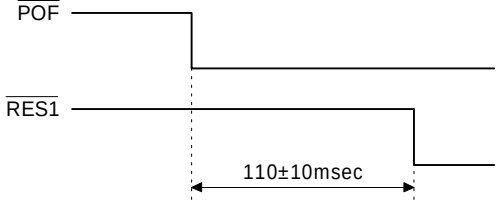


Fig. 9-4

3) Key and switch scanning

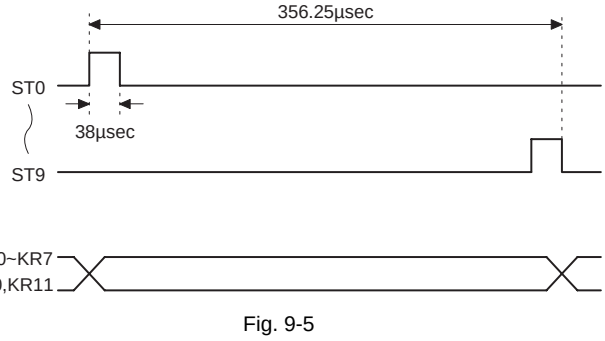


Fig. 9-5

As the strobe signal, 8 bits of ST0 - 8 are used.

KR0 - KR7 are used as the key return signal. KR10 is used as the return signal of the paper feed key, cashier key and MRS switch. KR11 is used as the return signal of the mode switch.

4) DISPLAY CONTROL

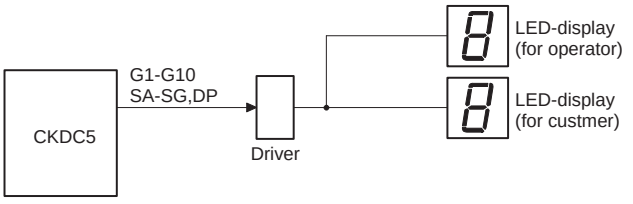


Fig. 9-6

CKDC8 directly drives the LED display unit.

10. Power supply circuit

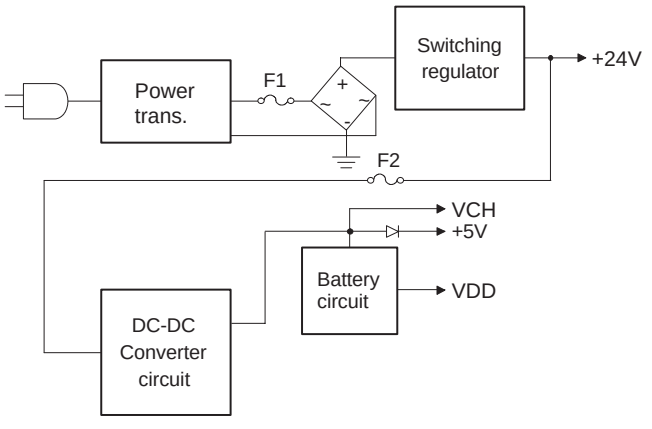


Fig. 10-1

+24V: Printer, solenoid power

+5V: VCC (Logic power)

VDD: Battery charge, Battery back-uped power, CKDC-8 Back-up power

VCH: Fiscal memory unit

CHAPTER 5. TEST FUNCTION

1. General

1) This diagnostic program has been developed for diagnosing machine functions in the field. The program is contained within the ER-A450.
   The diagnostic program is stored in the external ROM which will be executed by the CPU (H8/510) which requires the following diagnostic operations:

   a) Proper power supply voltages are mandatory for logic circuits (+5V, VDD, POFF, +12.5V, +24V).

   b) CPU input/output pins, CPU internal logic, CKDC8, MPCA7, system bus and common ROM/RAM must be working properly.

2. Operational procedure

To start the diagnostic program, you must enter the following command.
3-digit test item number → key in the SRV mode.

The key assignment must be properly set and the ROM and RAM must be operating properly to go into this mode. This is necessary because the control jumps to the program area in the SRV mode. A master reset must be performed before operating the ECR for the first time. After any option is installed, a program reset is required. When the master reset or program reset is performed, be sure to check the printout on the journal paper.

Master reset:	Turn power on in the SRV' mode and change it to the SRV mode with the [JF] key pressed.
Journal print:	MASTER RESET ***
Program reset:	Turn power on in the SRV' mode and change it to the SRV mode.
Journal print:	PRG. RESET ***

3. Test command list

With the SRV mode and the following test code entry, the test start.

CODE	DESCRIPTION
100	Display & Buzzer test
101	Key code & Cashier key test
102	R/J printer test
104	Keyboard test
105	Mode switch test
106	Printer sensor test
108	Calendar oscklator test
109	SSP test
110	Drawer open sensor test (For standard drawer)
111	Drawer open sensor test (For remote drawer)
120	Standard RAM test
130	Standard ROM test
119	A/D conversion test
200	Option RAM test
500	RS-232 loop back test

4. Test contents

[1] Display & Buzzer test

1) Key operation

100 → [TL]

2) Functional description

Display the following message on the front and the rear display boards.

```
1. 2. 3. 4. 5. 6. 7. 8. 9. 0.
```

A decimal point shifts from lower number of digit by one digit (per 200m sec.).

Next, display the following segments (for approx. 1 sec.).

```
8. 8. 8. 8. 8. 8. 8. 8. 8. 8.
```

Repeat the above two kinds of displays.

Sound a buzzer continuously during test.

3) Check items

a) The display must be correctly shown at each position.

b) The luminosity of displays must be uniform and even at each position.

c) Abnormal buzzer sound is not allowed.

4) Test termination

Press any key. The test terminates with the test and message printed

```
100
```

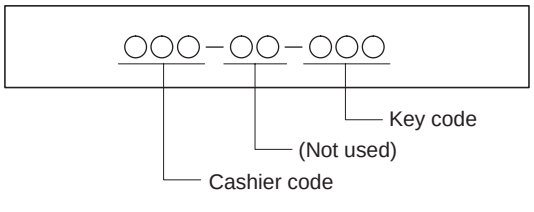
[2] Key code & Cashier key test

1) Key operation

101 → [TL]

2) Functional description

Key code, MRS switch state and Cashier code are displayed.



3) Check items

a) Cashier code (One hole cashier key: OPTION)

Display	State
000	Off
001	Cashier key No.1
002	Cashier key No.2
003	Cashier key No.3
↓	↓
014	Cashier key No.14
015	Cashier key No.15

b) Key code

HARDWARE CODE" of the following keys will be displayed ever time the keys are pressed.
"---" indicates that a key is struck twice and also that input data is not accepted.

[KEY POSITION CODE]

<ALL KEY>

								65	68	67	58	77	78
								66	55	56	57	48	38
R	J	63	62	61	52	51	60	40	45	35	46	47	37
74	43	33	42	32	41	31	49	30	76	75	36	28	27
14	23	24	22	72	21	71	20	70	15	05	16	17	18
04	13	03	12	02	11	01	10	00	26	25	06	07	08

<ER-A450 STANDARD KEY BOARD LAYOUT>

									68	67	58	77	78
								66	55	56	57	48	38
R	J	63	62	61	52	51		40	45	35	46	47	37
74	43	33	42	32	41	31		30	76	75	36	28	27
14	23	24	22	72	21	71		70	15	05	16		18
04	13	03	12	02	11	01		00	26	25	06		08

4) Test termination

Change the mode switch position other than SRV position to terminate the test.

The test terminates with the test and message printed

1 0 1

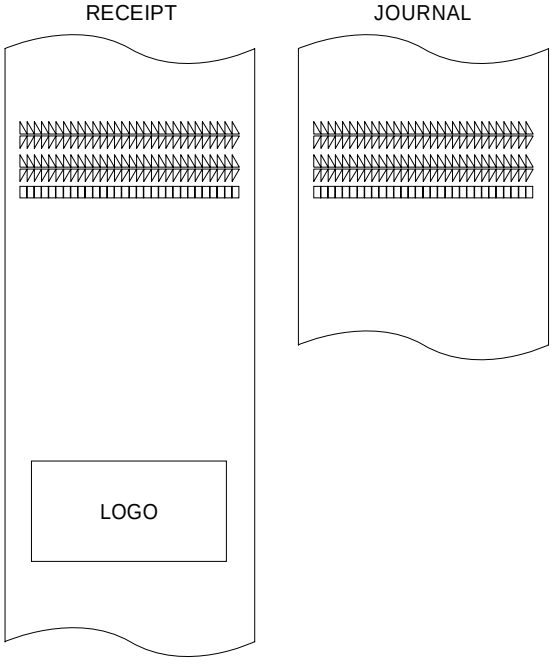
[3] R/J printer test

1) Key operation

102 → TL

2) Functional description

Five lines of special characters are printed as follows on the receipt and the journal regardless of receipt (ON/OFF) switch setting.



3) Check items

1. Check that the slanted lines of special characters are clearly printed.
2. Check that the characters are printed at a uniform density.
3. Check the paper feed operation and the logo print.

4) Test termination

This check is terminated automatically.
The termination print is not performed.

[4] Keyboard test

1) Key operation

XXXX 104 → TL

XXXX: Sumcheck data

Standard keyboard layout sumcheck data	
ER-A450	2243

2) Functional description

Keyboard test is performed with the sumcheck data of key code.
For sumcheck data, data are inputted to the upper upper four digits befor the diagnostics code.
The data are compared with the added data which are added until the final key (TL) is pressed. if the data agree with the added data, the end print is made. If not, the error print is made.
The su check data is obtained by totalizing all key hardware codes except for the (TL) key and converting the total into a decimal figure.

[ALL KEY LAYOUT]

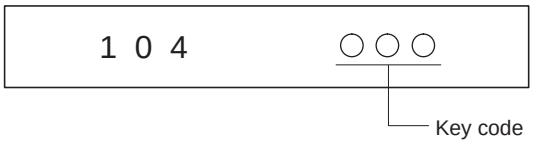
								41	44	43	3A	4D	4E
								42	37	38	39	30	26
R	J	3F	3E	3D	34	33	3C	28	2D	23	2E	2F	25
A4	2B	21	2A	20	29	1F	32	1E	4C	4B	24	1C	1B
0E	17	18	16	48	15	47	14	46	0F	05	10	11	12
04	0D	03	0C	02	0B	01	0A	00	1A	19	06	07	08

[STANDARD KEYBOARD LAYOUT]

SUMCHECK DATA = A4 + 0E + 04 + 2B + 17 + · · · · · · · · = 2243

								44	43	3A	4D	4E	
								42	37	38	39	30	26
R	J	3F	3E	3D	34	33		28	2D	23	2E	2F	25
A4	2B	21	2A	20	29	1F		1E	4C	4B	24	1C	1B
0E	17	18	16	48	15	47		46	0F	05	10	11	12
04	0D	03	0C	02	0B	01		00	1A	19	06		08

Display the following message on the front display.



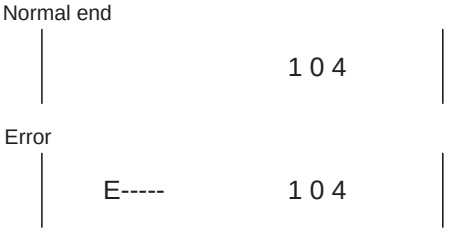
3) Check items

a) Check of the display in the test and the content of end print.

4) Test termination

This check is terminated automatically.

The test terminates with the test and message printed

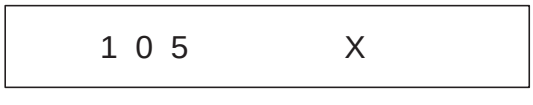


[5] Mode switch test

1) Key operation

2) Functional description

Display the following message on the front display.



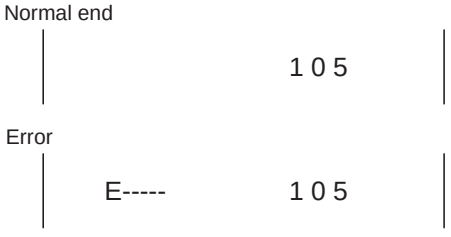
When the Mode Switch is switched over in the following order, a numerical value corresponding to each position of mode switch is displayed at X.

3) Check items

a) Check of the display in the test and the content of end print.

4) Test termination

The test terminates with the test and message printed

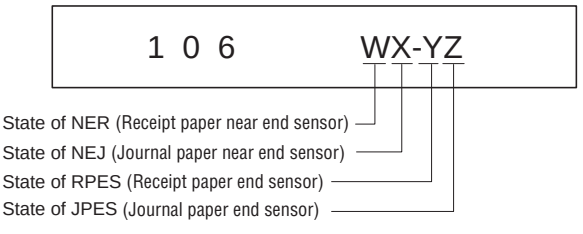


[6] Printer sensor test

1) Key operation

2) Functional description

State of the paper near end sensor is sensed and displayed.


1 0 6 WX-YZ
State of NER (Receipt paper near end sensor)
State of NEJ (Journal paper near end sensor)
State of RPES (Receipt paper end sensor)
State of JPES (Journal paper end sensor)

3) Check items

	Displayed	Description
W (NER)	0	Receipt paper near end sensor: Detected
	1	Receipt paper near end sensor: Not detected
X (NEJ)	0	Journal paper near end sensor: Detected
	1	Journal paper near end sensor: Not detected
Y (RPES)	0	Receipt paper end sensor: Detected
	1	Receipt paper end sensor: Not detected
Z (JPES)	0	Journal paper end sensor: Detected
	1	Journal paper end sensor: Not detected

* "1" is always display when no sensor is used.

4) Test termination

Press any key. The test terminates with the test and message printed

[7] Calendar oscillator test

1) Key operation

108 → TL

2) Functional description

This program is used to test the calendar oscillator function.

Display:

✻ ✻ – ✻ ✻

"✻✻ – ✻✻" shows the current time.
"–" is blinking. (500ms ON and OFF)

3) Check items

Time elapsed after master reset must be displayed.

4) Test termination

Press any key. The terminates with the test and message printed

1 0 8

[8] SSP test

1)Key operation

109 → TL

2) Functional description

If an SSP is programmed, its contents are automatically chacked and the result is printed.

Display:

1 0 9

3) Check items

Check printing of the termination message.

4) Test termination

This check is terminated automatically.

The test terminates with the test and message printed

Normal end

1 0 9

Error

E----- 1 0 9

SSP table full

F----- 1 0 9

* In this SSP check, set the data for check in the empty area of SSP entry REG and erase the data for check after completion of check. Therefore SSP setting before check is not cleard.
If therefore there is no SSP entry REG remainedfor SSP check, F-print is performed to terminate the program without check.

[9] Drawer open sensor test (For standard test)

1) Key operation

110 → TL

2) Functional description

State of the drawer open sensor is sensed and displayed.

1 1 0 X

3) Check items

X	Description
O	Drawer open sensor detected. (Drawer opend)
C	Drawer open sensor not detected. (Drawer closed)

a) Check opening of the specified drawer.

b) Check the display indication when the drawer is open and closed.

4) Test termination

Press any key. The test terminates with the test and message printed

1 1 0

[10] Drawer open sensor test (For remote drawer)

1) Key operation

111 → TL

2) Functional description

State of the drawer open sensor is sensed and displayed.

1 1 1 X

3) Check items

X	Description
O	Drawer open sensor detected. (Drawer opend)
C	Drawer open sensor not detected. (Drawer closed)

a) Check opening of the specified drawer.

b) Check the display indication when the drawer is open and closed.

4) Test termination

Press any key. The test terminates with the test and message printed

1 1 1

[11] Standard RAM test

1) Key operation

120 → TL

2) Functional description

Perform the following check for the standard RAM 128 KByte SRAM. The memory contents should not be changed before and after the check.

Perform the following processes for memory address to be checked (1E0000H~1F0000H).

PASS1: Save memory data.

PASS2: Write data "0000H."

PASS3: Read and compare data "0000H," write data "5555H."

PASS4: Read and compare data "5555H," write data "AAAAH."

PASS5: Read and compare data "AAAAH."

PASS6: Restore the memory data.

If a compare error occurs in the check sequence PASS1-PASS6, an error print is made. If no error occurs through all address, the check ends normally.

The following address check is performed further.

Check point address =

1E0000H, 1E0001H
1E0002H, 1E0004H
1E0008H, 1E0010H
1E0020H, 1E0040H
1E0080H, 1E0100H
1E0200H, 1E0400H
1E0800H, 1E1000H
1E2000H, 1E4000H
1E8000H, 1F0000H

7-SEGMENT DISPLAY: 1 2 0

3) Check the following items:

Check the termination printout.

4) Test termination

The test terminates after printing the termination printout.

Termination printout:

Normal termination		120
Abnormal termination	Ex – – – – –	120
		*****

X = 1: Data check error
2: Address check error

Note: When an error occurs, the error print is performed and the check is terminated. The error occurrence address is shown in hexadecimal at positions shown with ***** .

[12] Standard ROM test

1) Key operation

130 → TL

2) Functional description

Sum check of the standard ROM (C00000H - C7FFFFH) is performed. If the lower two digits of SUM is 10H, it is normal.

7-SEGMENT DISPLAY: 1 3 0

3) Check the following items:

Check the printout after the test.

4) Test termination

The test automatically terminates with termination message.

Normal termination print		130
	ROM1	27040*****
		*****
Error termination print	E – – – –	130
	ROM1	27040*****
		*****

Note: "***** " means the ROM version number.
The underlined section (10 bytes) of code table is provided in the ROM as a standard and the table content is always printed.
The table position is the upper 10 digits of the ROM address.
The check sum correction address is the last address -0FH.

[13] A/D conversion test

1) Key operation

151 → TL

2) Contents

The digital conversion value of the input signal to the CPU A/D convertor is displayed sequentially. The display channel is changes is approx. 1 sec. interval by timer control and is displayed repeatedly.

Thermistor input

7-SEGMENT DISPLAY: 1 5 1 1 XXXX

Vrf input: Vrf means the presumed voltage of VRF when VCC is supposed to be +0.5V.

7-SEGMENT DISPLAY: 1 5 1 2 XXXX

+24V input

7-SEGMENT DISPLAY: 1 5 1 3 XXXX

Head input

7-SEGMENT DISPLAY: 1 5 1 4 XXXX

Note: "XXXXX": The 10 bit data of the A/D convertor displayed in decimal number.
Therefore, its connect may be 0000 ~ 1024.

3) Confirmation

Check the display content.

4) Termination

To when the mode switch is set to any mode other than SRV mode, the termination print is made and the test is terminated.

151
Test termination print

[14] Option RAM test

1) Key operation

200 → TL

JOB #NO.	RAM NO.	Memory to be checked	Address area to be checked
200	Option RAM	ER-03RA	200000H ~ 27FFFFH

2) Content

The following check are performed for the optional RAM.

The following process is performed for memory addresses to be checked.

PASS1: memory data save

PASS2: Data "0000H" write

PASS3: Data "0000H" read and comparison, data "5555H" write

PASS4: Data "5555H" read and comparison, data "AAAAH" write

PASS5: Data "AAAAH" read and comparison

PASS6: Memory data restore

If a compare error is found in the check sequence from PASS1 to PASS6, error print (error code E1) is performed. If there is no error found to the end of the last address, the operation is completed normally.
Then the following address check is performed. "○" shows a valid address, and "X" shows an invalid address.
In case of an error, error code E2 is printed.

Check Address	JOB#201(ER-03RA)
200000H	○
200001H	○
200002H	○
200004H	○
200008H	○
200010H	○
200020H	○
200040H	○
200080H	○
200100H	○
200200H	○
200400H	○
200800H	○
201000H	○
202000H	○
204000H	○
208000H	○
210000H	○
220000H	○
240000H	○
260000H	○

7-SEGMENT DISPLAY: 2 0 0

3) Check the following items.

Check the termination print.

4) Test termination

The test terminates after printing the termination printout.
Termination print

```
E1---        200   (data check error)
E2---        200   (address check error)
             *****
             200   (normal end)
```

****** : Error address

[15] RS-232 loop back test

Connect the loop back connector(UKOG-6705RCZZ) to RS232 connector.

1) Key operation

500 → TL

2) Functional description

Control signal check

OUT PUT		INPUT			
/ER	/RS	/DR	/CI	/CD	/CS
OFF	OFF	OFF	OFF	OFF	OFF
OFF	ON	OFF	OFF	ON	ON
ON	OFF	ON	ON	OFF	OFF
ON	ON	ON	ON	ON	ON

Data communication check
Perform 256-byte branch loop back test between SD and RD.

DATA: $00 - $FF BAUD RATE: 9600 BPS

Display:

5 0 0

4) Test termination

This check is terminated automatically.
The test terminates with the test and message printed

Normal end

```
RS TEST          OK
```

Error

```
RS TEST    ＊＊NG＊＊ER XX
```

XX: Error code	
E1	ER-DR error
E2	ER-CI error
E3	RS-CD error
E4	RS-CS error
E5	SD-RD error (DATA error)
E6	SD-RD error (DATA error/Flaming error)

CHAPTER 6. DOWN LOAD FUNCTION

1. General

RAM data can be transmitted in the following two methods.

Save the data before servicing as follows:

① ECR ⟷ ECR

- Cable: 9 pin D-SUB – 9 pin D-SUB

Fig. 1-1

② ECR ⟷ ER-02FD

- Cable: 9 pin D-SUB – 25 pin D-SUB

Fig. 1-2

2. SIO interface specification

1) Operation:	Simplex
2) Line configuration:	Direct connect
3) Data rate:	19200, 9600, 4800, 2400, 1200, 600, 300BPS (Selected by SRV JOB#903-A)
4) Sync mode:	Asynchronous
5) Checking:	Vertical parity (odd)
6) Code:	7 bits (ASCII)
7) Bit sequence:	LSB first
8) Line level:	RS232 level
9) Data forma:	

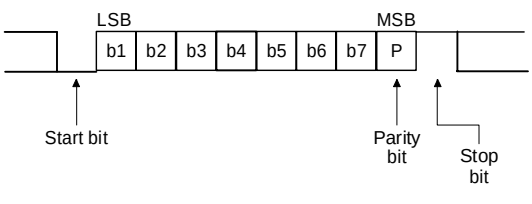
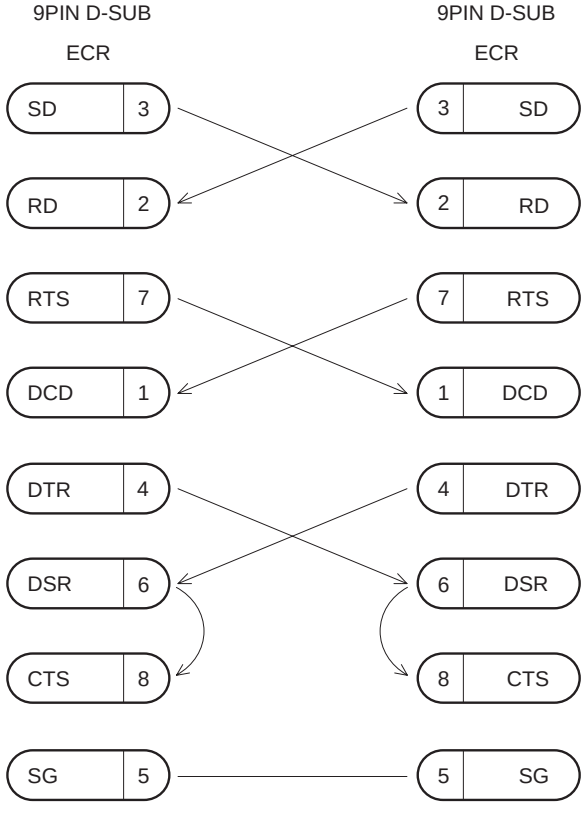


FIg. 2-1

3. Location of connector pins

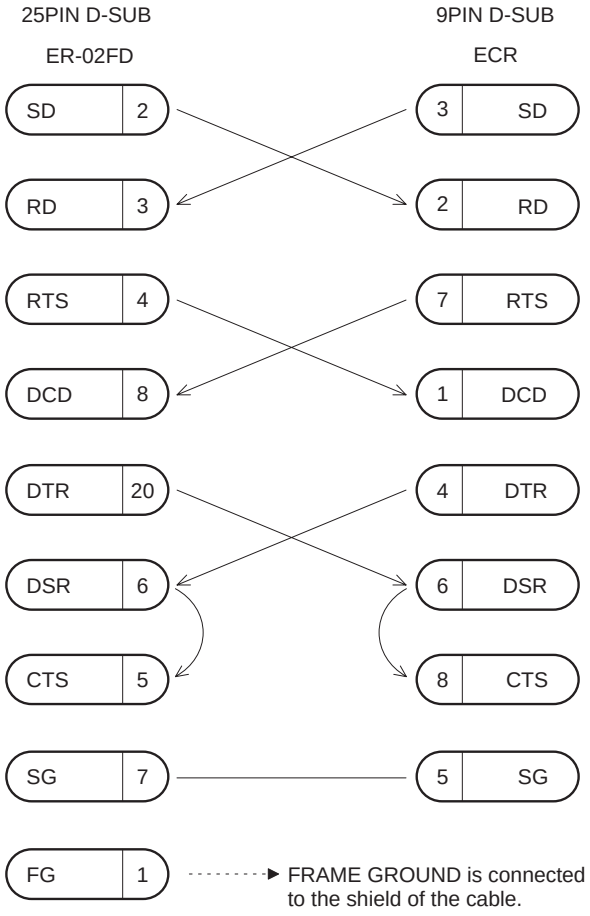
① ECR-ECR cable



SD : TRANSMITTED DATA
RD : RECEIVED DATA
DTR: DATA TERMINAL READY
DSR: DATA SET READY
RTS: REQUEST TO SEND
DCD: DATA CARRIER DETECTOR
CTS: CLEAR TO SEND

Fig. 3-1

② ECR-ER-02FD cable



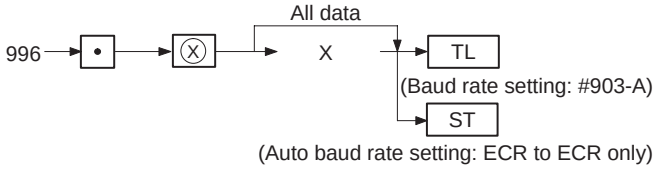
SD : TRANSMITTED DATA
RD : RECEIVED DATA
DTR: DATA TERMINAL READY
DSR: DATA SET READY
RTS: REQUEST TO SEND
DCD: DATA CARRIER DETECTOR
CTS: CLEAR TO SEND
FG : FRAME GROUND

Fig. 3-2

4. Application specification

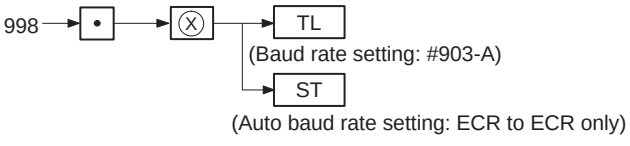
The following service (SRV) modes are available for the serial data transfer of the ECR

1) Data transmit (Source side)



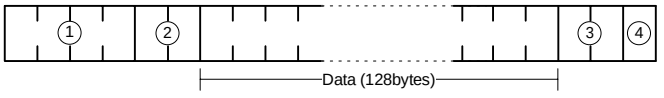
X: 0=SSP DATA

2) Data receive (Target)



5. Data format

A single byte image of the RAM data to be transmitted is divided into a high order 4 bits and low order 4 bits and converted into ASCII code. Then, the image of the memory is sent in the following format:



① Memory top address: 0000H ~ FFFFH
Top address of the memory to be transmitted in ASCII number.

② Page:1F ~ 27,00
Page of the memory to be transmitted in ASCII number.

③ Sum check

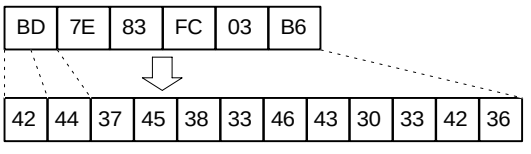
④ End code: Hex 0D

NOTE:

- In order that contents of RAM memory may not over-ride pages for this job, RAM image is sent in unit of 64 bytes from the address 0000. In other words, 128 bytes are sent at one time on the transmit data format.

RAM DATA FORMAT

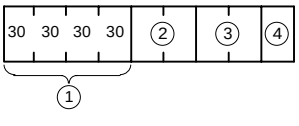
Exhibit:



Code table

HEX	ASCII	Character	HEX	ASCII	Character
0	30	0	8	38	8
1	31	1	9	39	9
2	32	2	A	41	A
3	33	3	B	42	B
4	34	4	C	43	C
5	35	5	D	44	D
6	36	6	E	45	E
7	37	7	F	46	F

6. END record



① End message: Fixed to 30303030.

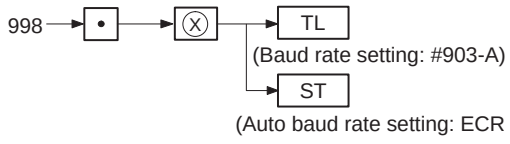
② End massage: Fixed to 4646.

③ Sum check

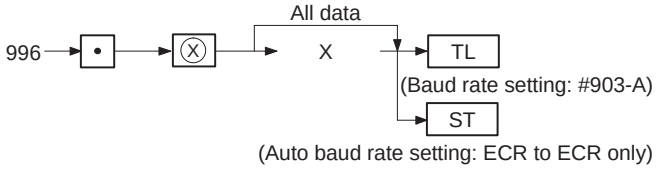
④ End code: CR (0D)

7. Operational method

1) To prepare an ECR to receive data from another ECR or the ER-02FD, the memory size of the receiving unit must the same as or greater than the sending unit.
2) Master reset the receiving ECR.
3) Connect loader cable between ECRs.
4) Set the receiving ECR ready to receive.



5) Start the sending ECR.



X: 0 = SSP

6) Transmission status.

Description of error status

1: Application error (Command error)
2: Application error (Parity error)
3: Application error (Check sum error)
4: Application error (Data size error)
5: Hard ware error
6: Power off error
7: Time out error
11: Application error (Transmit data size error)
12: Application error (Block sequence error)

7) Service reset the receiving ECR.

8. Saving/Loading of data to/From the FD unit Configuration

1) Turn off the power switch of the ER-02FD, and set the DIP switches of the FD unit as follows:

ER-02FD (The ER-01FD functions of the ER-02FD are used.)

DS-1								DS-2			
1	2	3	4	5	6	7	8	1	2	3	4
OFF	ON	OFF	ON	OFF	OFF	OFF	ON	X	ON	OFF	OFF

Data rate

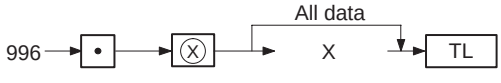
4	6	Rate [bps]
OFF	OFF	19200
ON	OFF	9600
OFF	ON	4800
ON	ON	2400

Disk format
CCP/M: OFF
PC-DOS: ON

2) Connect the cable.

Saving data

1) Turn on the power switch and insert a floppy disk which has been formatted.
2) Start the SEND JOB on the ECR side as follows:

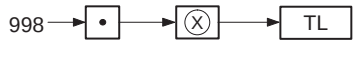


X: 0 = SSP

3) Data transmission is started and the green lamp on the ER-02FD blinks.

Loading data

1) Turn on the power switch and insert the floppy disk which stores the data.
2) Start the RECEIVE JOB on the ECR side as follows:



3) Press the SEND key on the FD unit.
4) Data transmission is started and the Green lamp on the ER-02FD blinks.
5) Service reset the ECR.

CHAPTER 7. SERVICE PRECAUTION

1. Error code table

When the following error codes are displayed, press the CL key and take a proper action according to the table below.

Error code	Error status	Action
E01	Registration error	Make a correct key entry.
E02	Misoperation error	Make a correct key entry.
E03	Undefined code is entered.	Enter a correct code, or declare it by the programming.
E04	Paper empty	Replace a journal paper roll with a new one.
E05	Secret code error	Enter a correct secret code.
E07	Memory is full.	Expand the file within a capacity of memory.
E11	Compulsory depression of the ST key for direct finalization	Press the ST key and continue the operation.
E12	Compulsory tendering	Make a tendering operation.
E22	Overlapped cashier error	
E23	Cashier resetting over error	
E31	Compulsory non-add code entry	Enter a non-add code.
E32	No entry of your cashier code	Make a cashier code entry.
E33	The current cashier code should not be changed.	Change a cashier after finalizing the transaction.
E34	Overflow limitation error	Make a registration within a limit of entry.
E35	The open price entry is inhibited.	Make a preset price entry.
E36	The preset price entry is inhibited.	Make an open price entry.
E37	The direct finalization is inhibited.	Make a tendering operation.
E58	Undefined clerk code is entered	Enter a correct clerk code.
E67	Registration buffer is full.	
E76	The drawer is still opened.	Close the drawer.
E86	Communication error	SRV #996/#998
E87	Data format error	SRV #996/#998
E88	Time-out error	SRV #996/#998

2. Conditions for soldering circuit parts

To solder the following parts manually, follow the conditions described below.

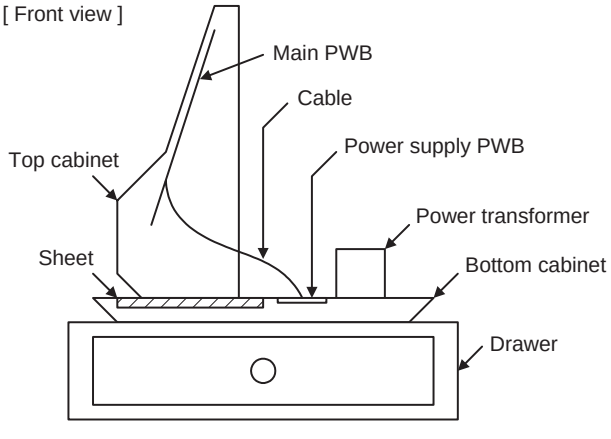
PARTS NAME	PARTS CODE	LOCATION	CONDITIONS FOR SOLDERING
Front LED (HDSP5621)	VHPHDSP5621−1	Front LED PWB: FND1-5	315°C/2 sec.
Pop-up LED (HDSP-F501#S02)	VHPHDSPF501−1	Pop-up LED PWB: FND1-10	315°C/2 sec.

3. Caution to be taken when removing the TOP CABINET

After removing the ER-A450's TOP CABINET from the BOTTOM CABINET, put the TOP CABINET on the positions given below to prevent the cable that connects the MAIN PWB and POWER SUPPLY PWB from disconnecting.

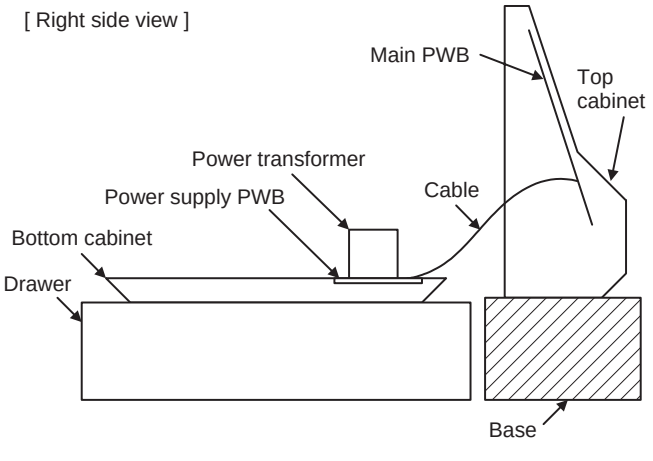
1) Put the TOP CABINET on the left of the BOTTOM CABINET.
   Put a sheet on the BOTTOM CABINET and put the TOP CABINET upright on the sheet, as shown below.

[Front view]



2) Put the TOP CABINET behind the drawer
   Put a base (proper height) behind the drawer and put the TOP CABINET upright on the base, as shown below.

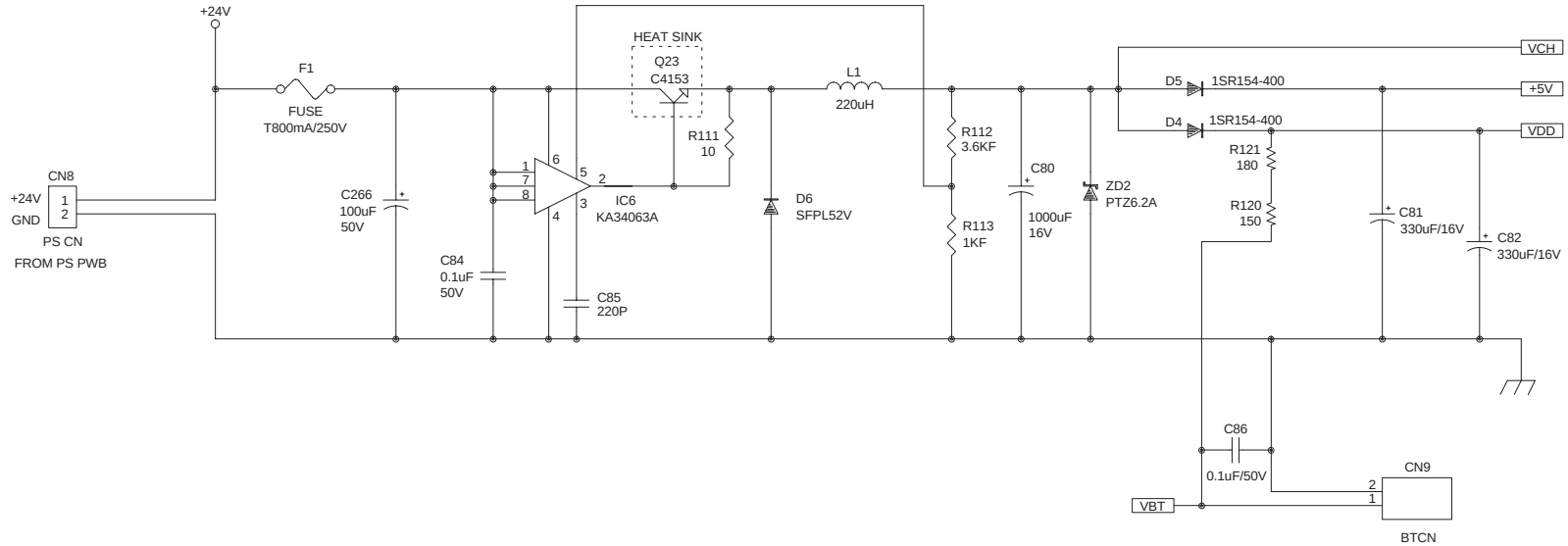
[Right side view]



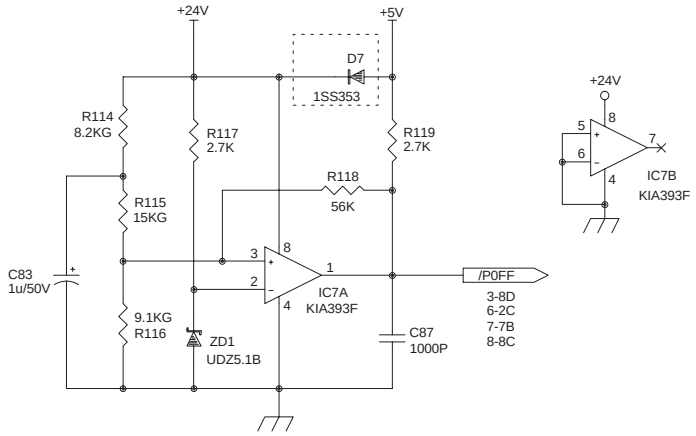
CHAPTER 8. CIRCUIT DIAGRAM & PWB LAYOUT

POWER SUPPLY(MAIN PWB)

1/10

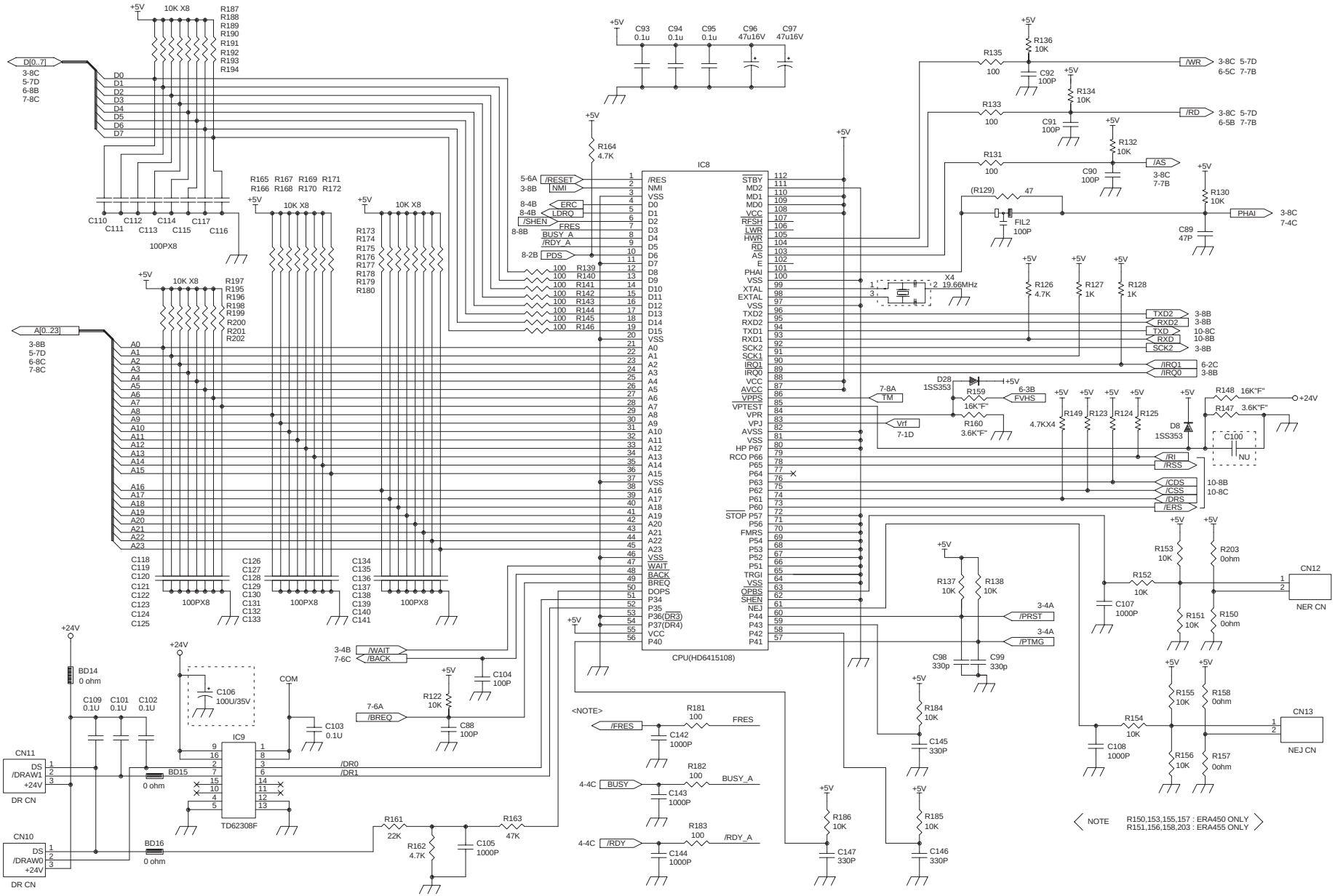


<P-OFF CIRCUIT>



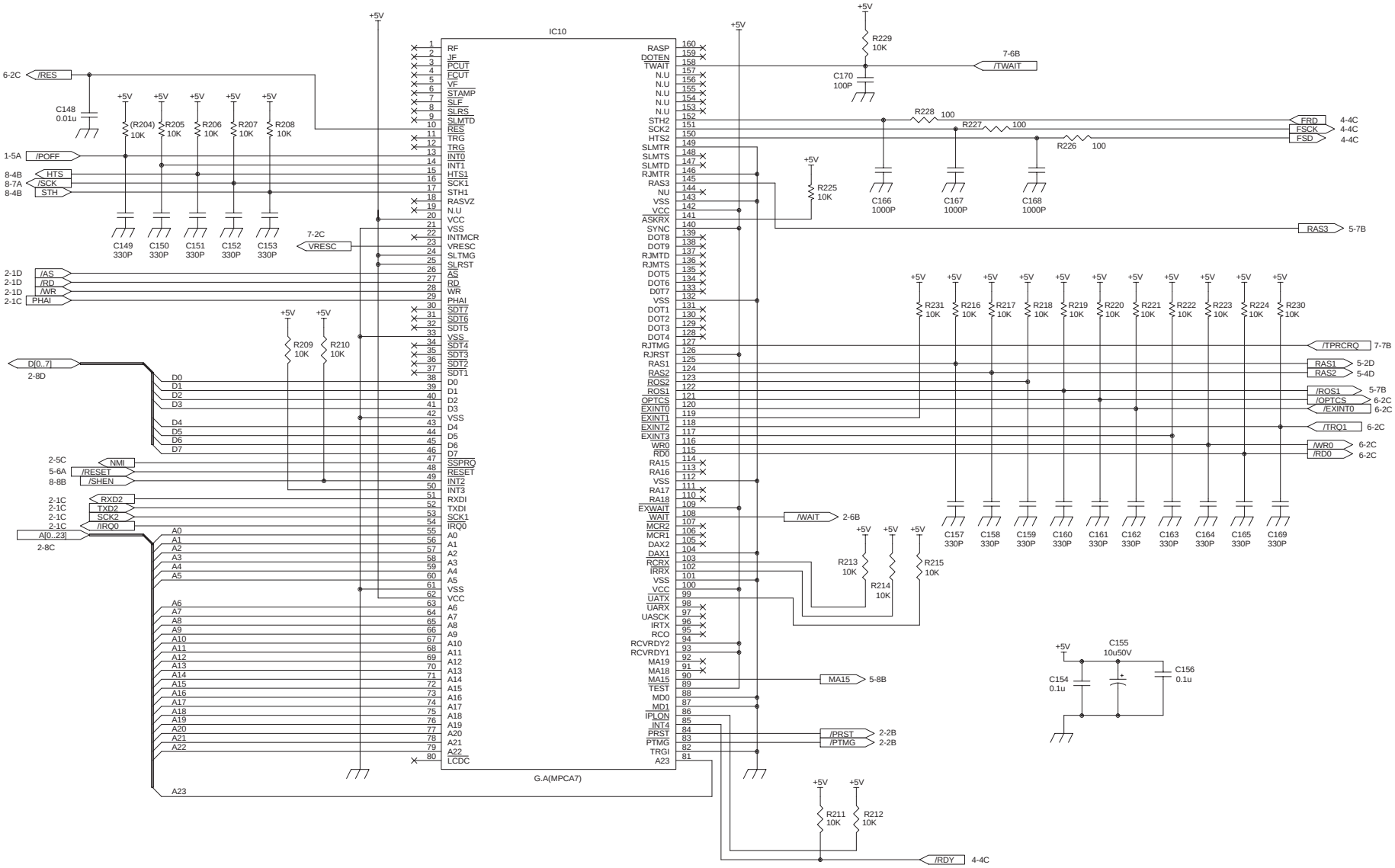
CPU(HD6415108)

2/10

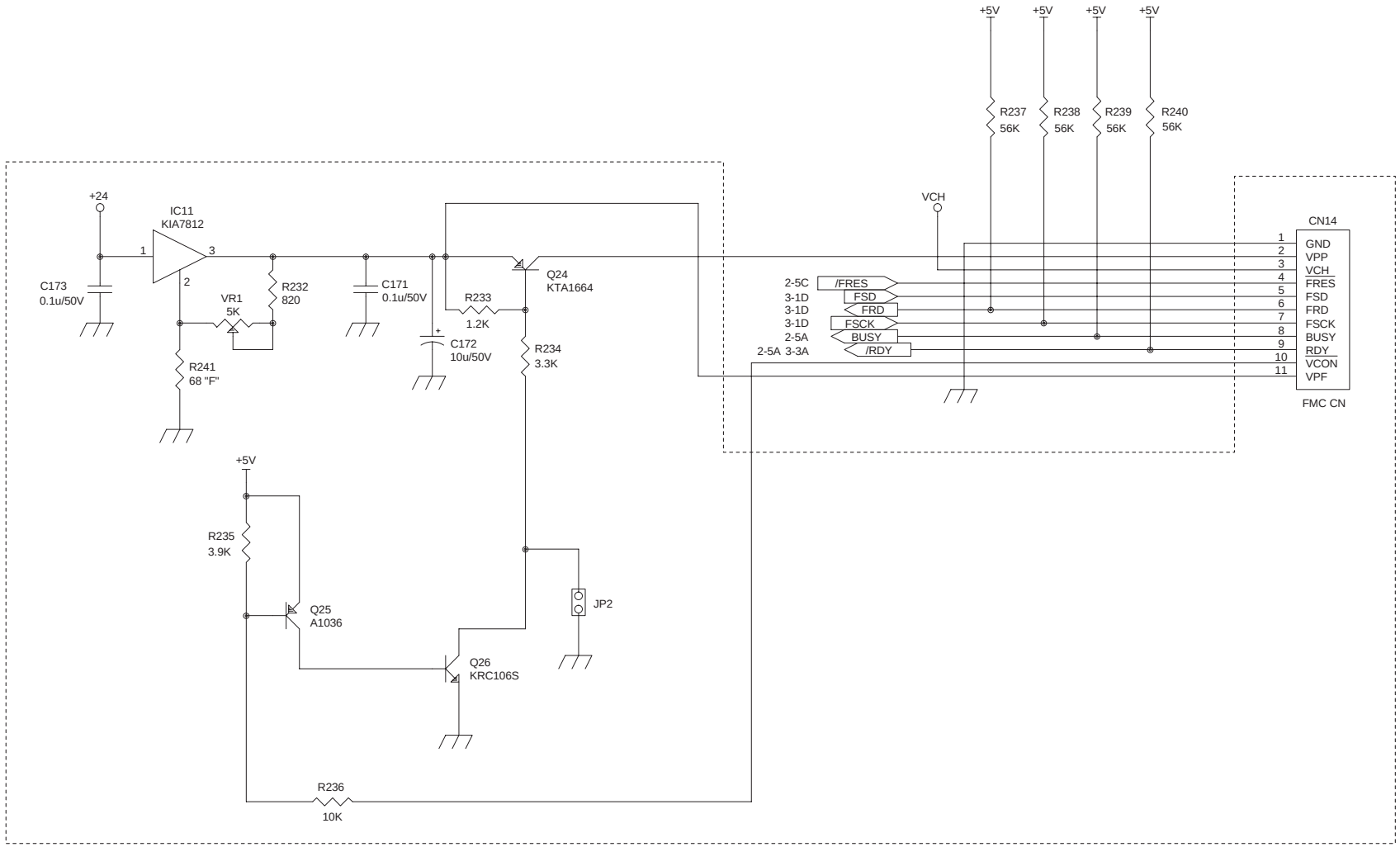


GATE ARRAY(MPCA7)

3/10



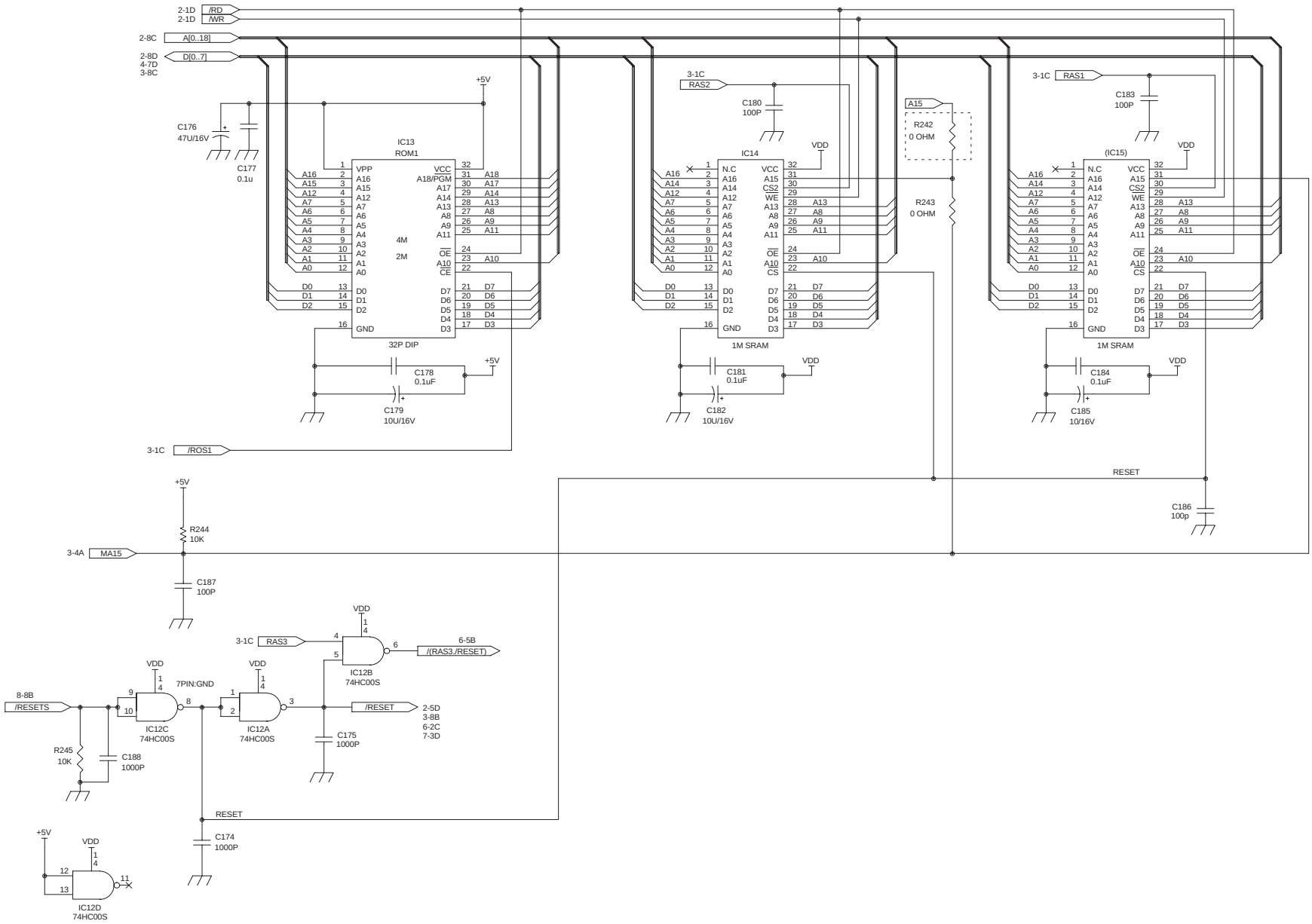
FMC (NOT USED)



Not mounted

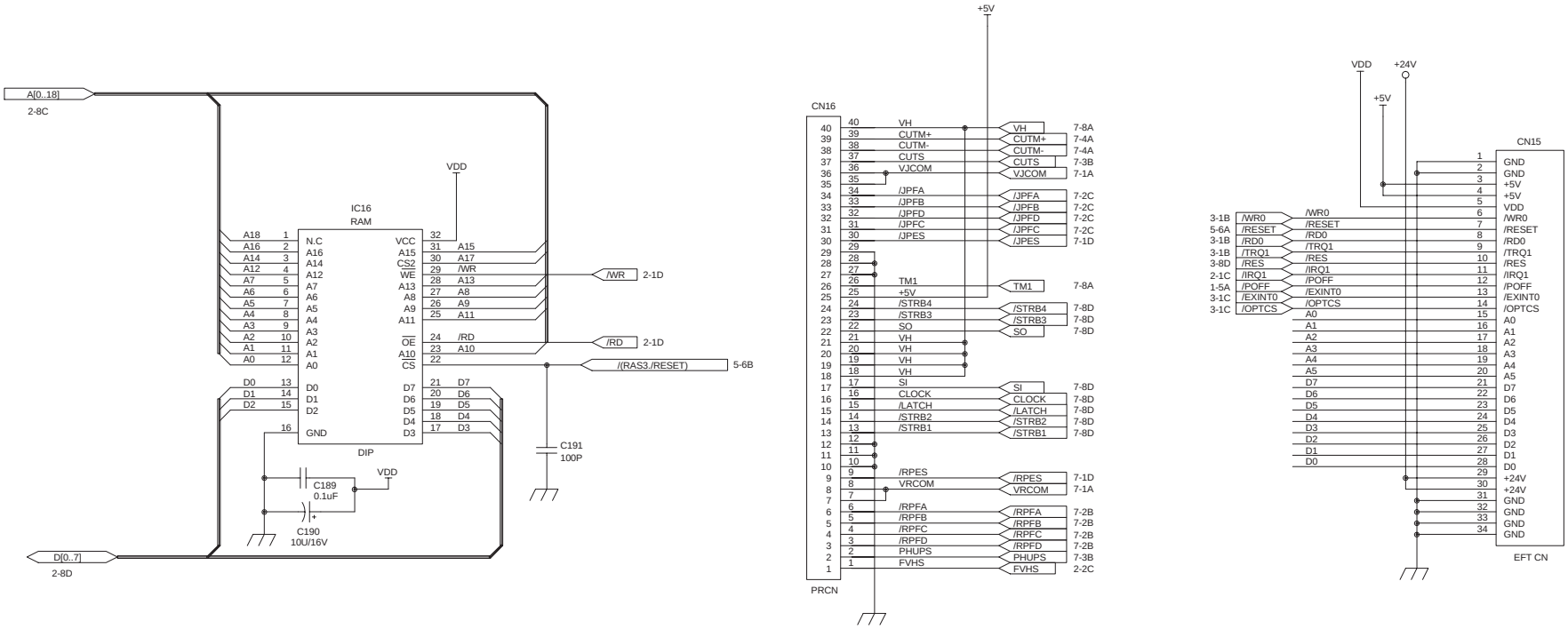
MAIN MEMORY

5/10

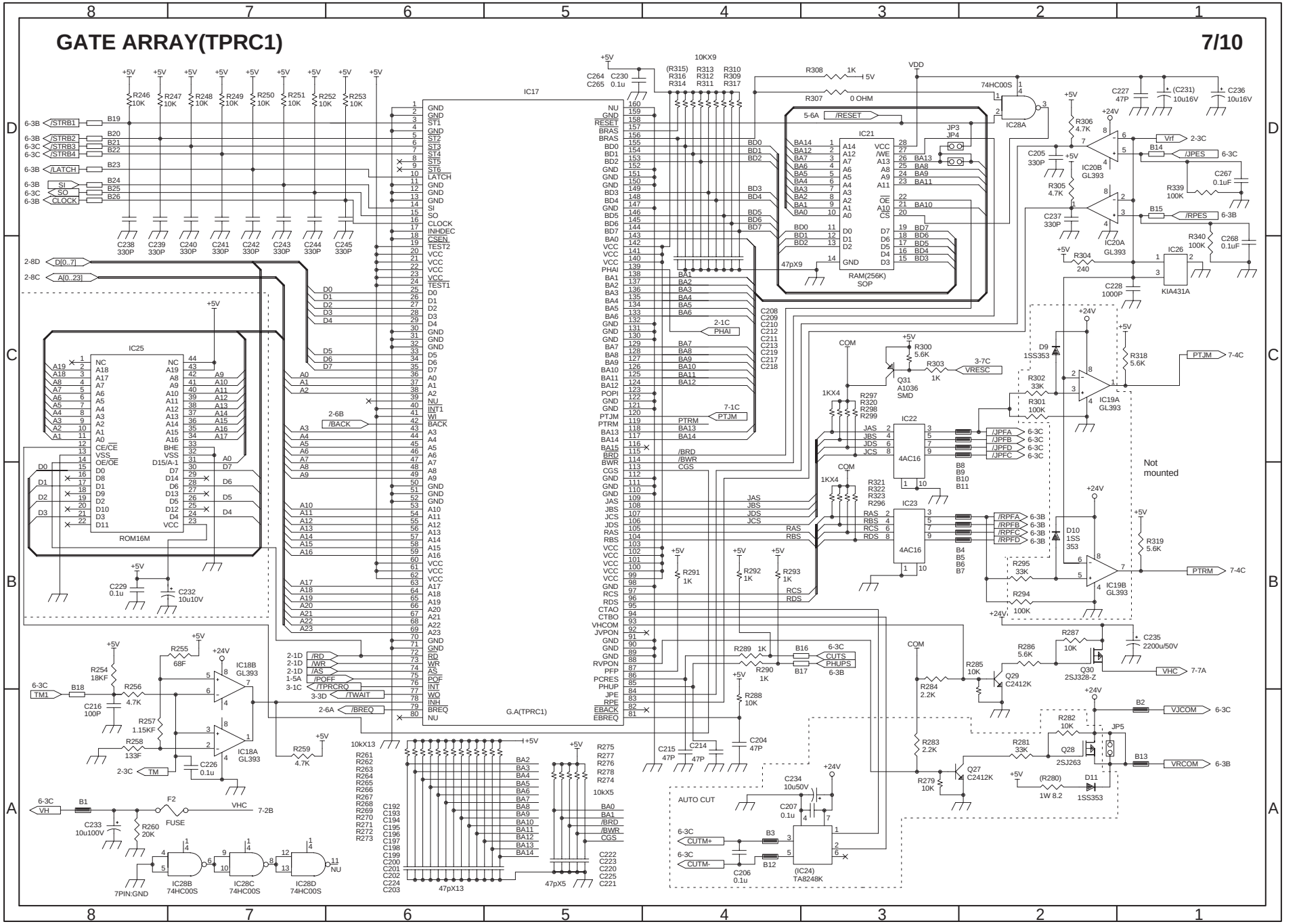


OPTION MEMORY/CONNECTOR

6/10

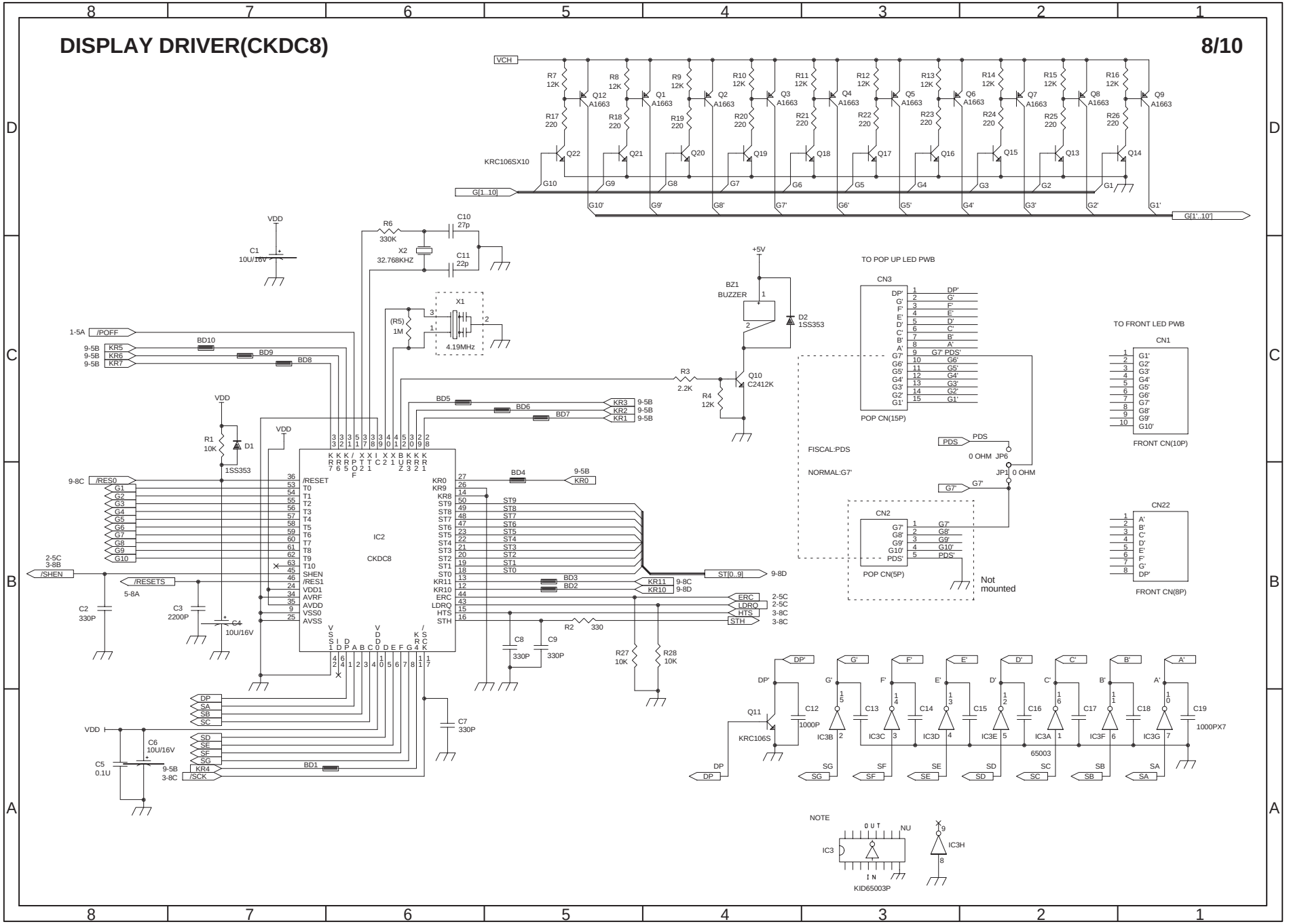


GATE ARRAY(TPRC1)

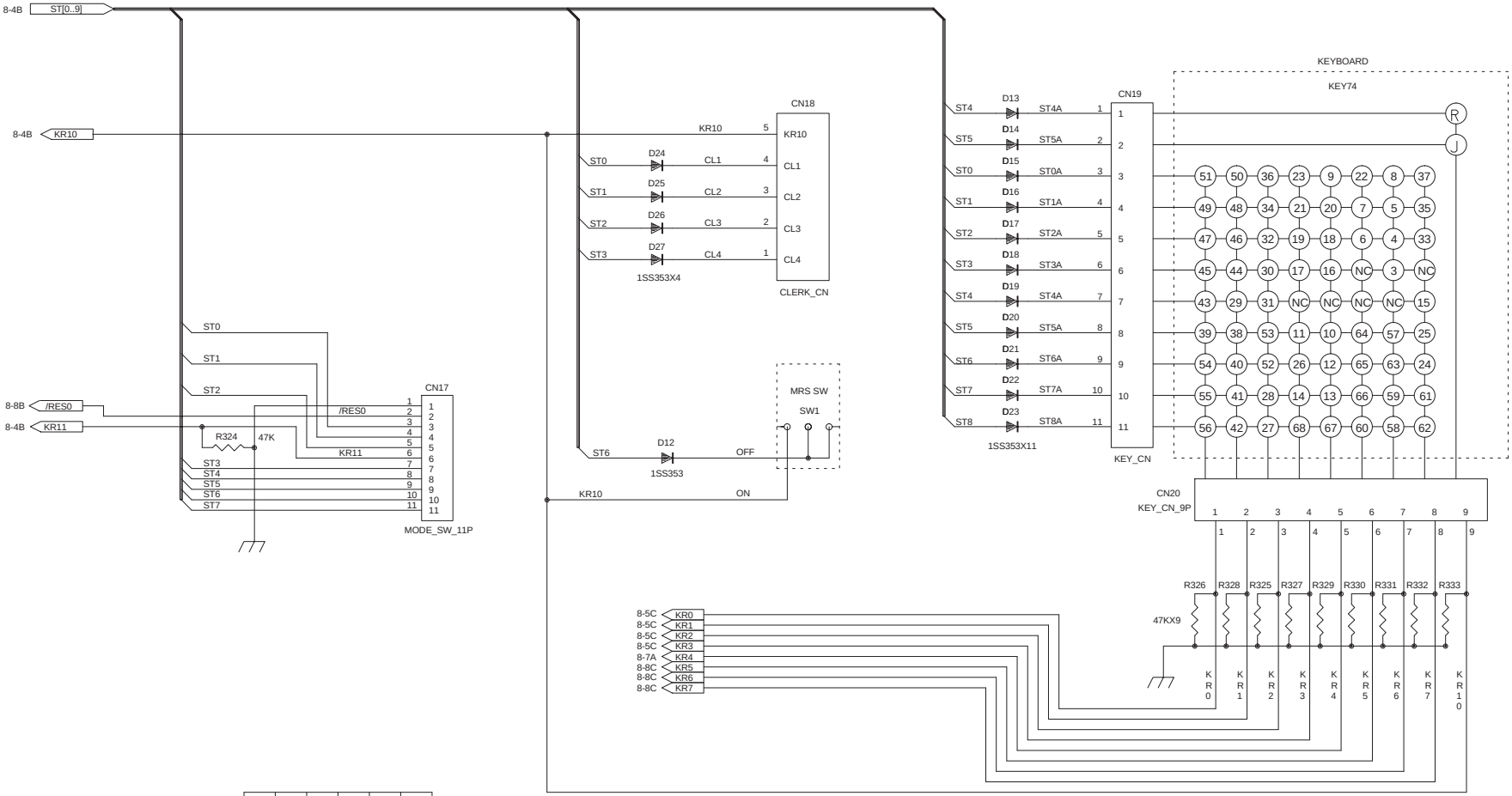


DISPLAY DRIVER(CKDC8)

8/10



KEY I/F(MAIN PWB)

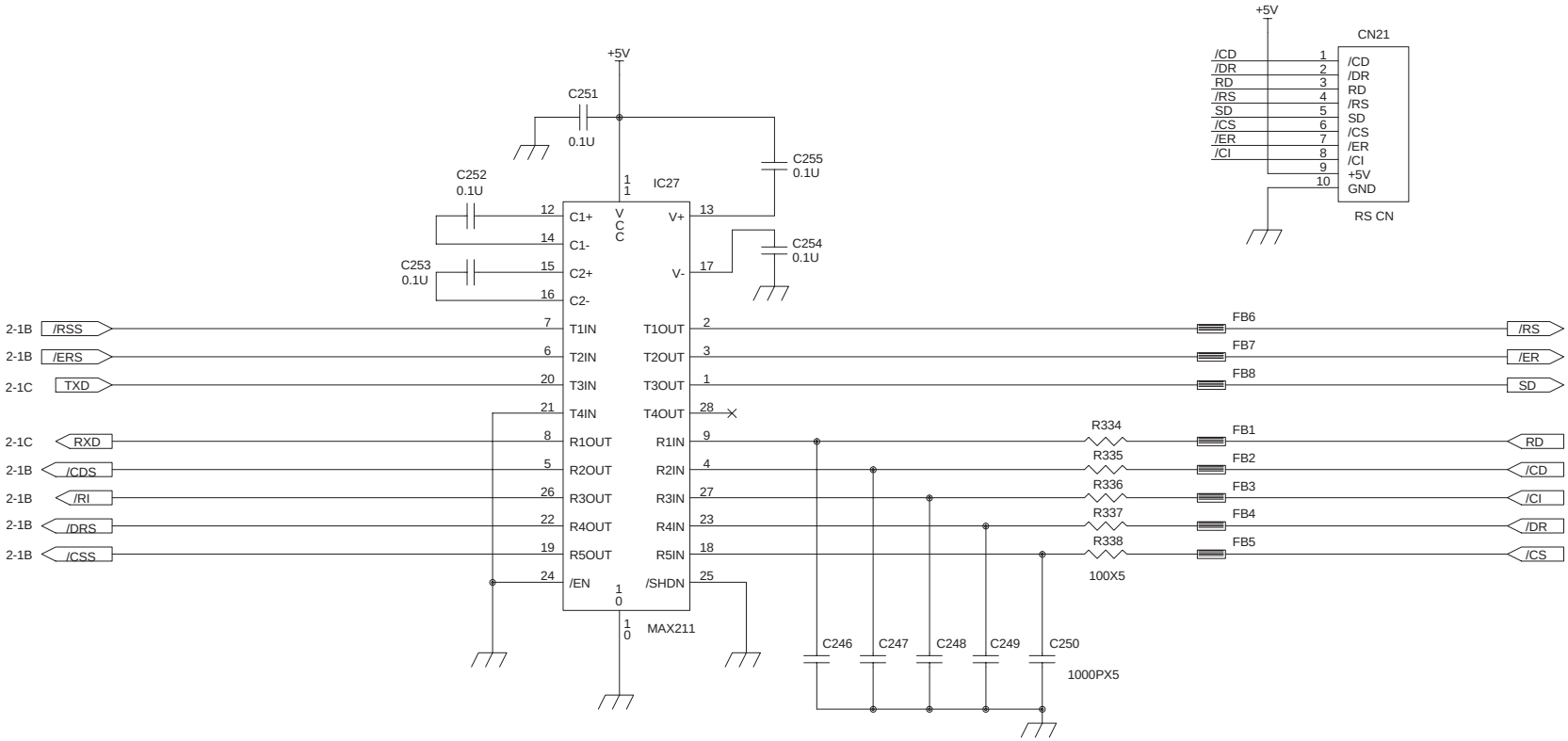


KEY BOARD

								57	58	59	60	61	62
								63	64	65	66	67	68
R	J	3	4	5	6	7	8	9	10	11	12	13	14
15	16	17	18	19	20	21	22	23	24	25	26	27	28
29	30	31	32	33	34	35	36	37	38	39	40	41	42
43	44	45	46	47	48	49	50	51	52	53	54	55	56

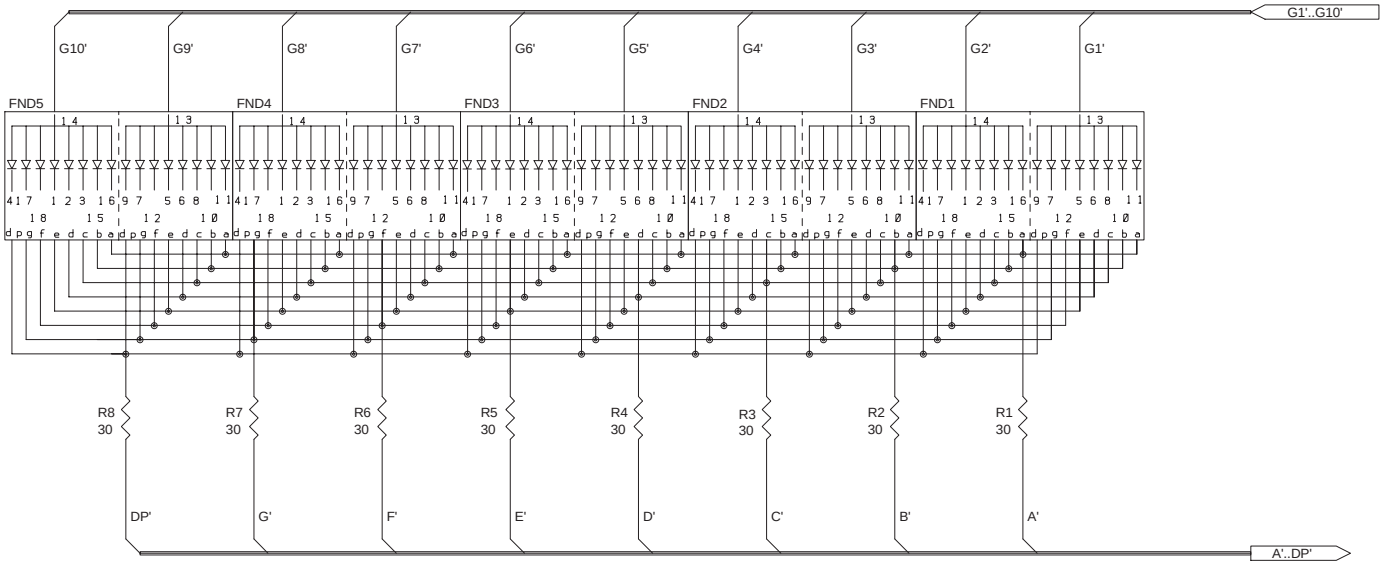
RS232C

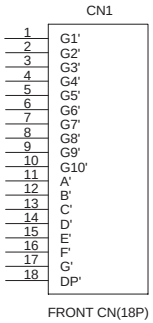
10/10


+5V
C251
0.1U
C255
0.1U
C252
0.1U
IC27
C253
0.1U
C254
0.1U
C1+
C1-
C2+
C2-
V+
V-
T1IN
T2IN
T3IN
T4IN
R1OUT
R2OUT
R3OUT
R4OUT
R5OUT
/EN
T1OUT
T2OUT
T3OUT
T4OUT
R1IN
R2IN
R3IN
R4IN
R5IN
/SHDN
MAX211
2-1B /RSS
2-1B /ERS
2-1C TXD
2-1C RXD
2-1B /CDS
2-1B /RI
2-1B /DRS
2-1B /CSS
FB6
FB7
FB8
FB1
FB2
FB3
FB4
FB5
/RS
/ER
SD
RD
/CD
/CI
/DR
/CS
R334
R335
R336
R337
R338
100X5
C246
C247
C248
C249
C250
1000PX5
CN21
/CD
/DR
RD
/RS
SD
/CS
/ER
/CI
+5V
GND
RS CN

FRONT PWB

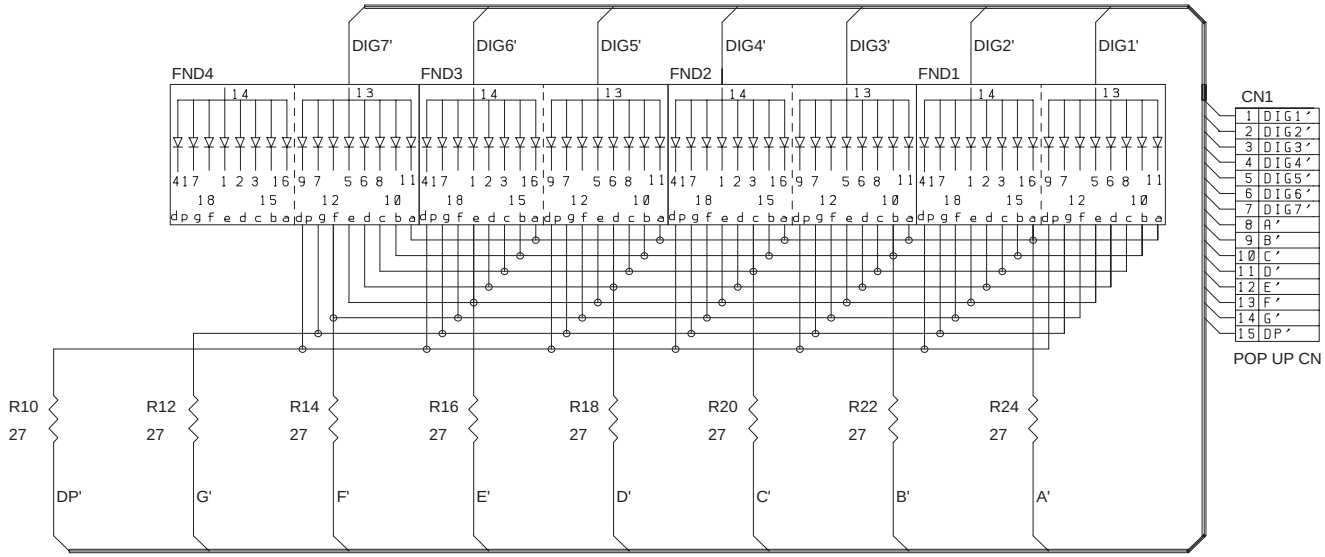
<FRONT LED PWB>





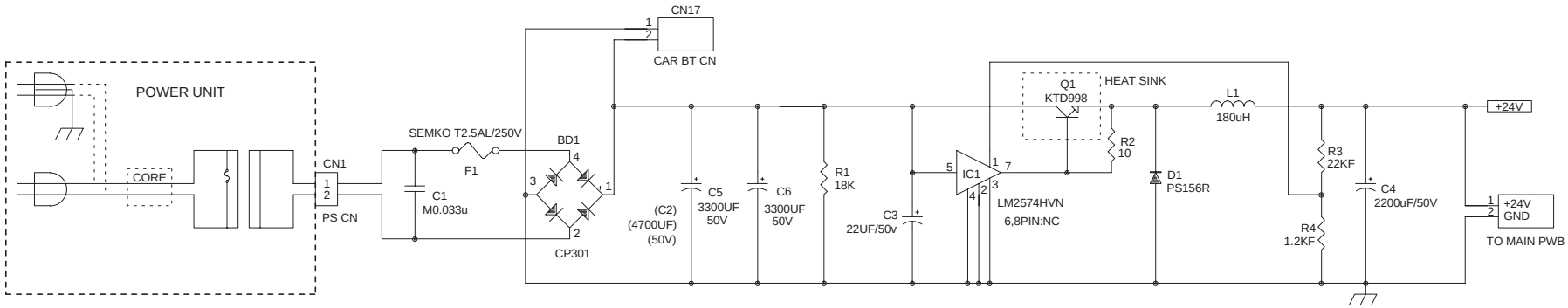
FRONT CN(18P)

POP-UP PWB


DIG7'
DIG6'
DIG5'
DIG4'
DIG3'
DIG2'
DIG1'
FND4
FND3
FND2
FND1
CN1
1 DIG1'
2 DIG2'
3 DIG3'
4 DIG4'
5 DIG5'
6 DIG6'
7 DIG7'
8 A'
9 B'
10 C'
11 D'
12 E'
13 F'
14 G'
15 DP'
POP UP CN
R10 27
R12 27
R14 27
R16 27
R18 27
R20 27
R22 27
R24 27
DP'
G'
F'
E'
D'
C'
B'
A'

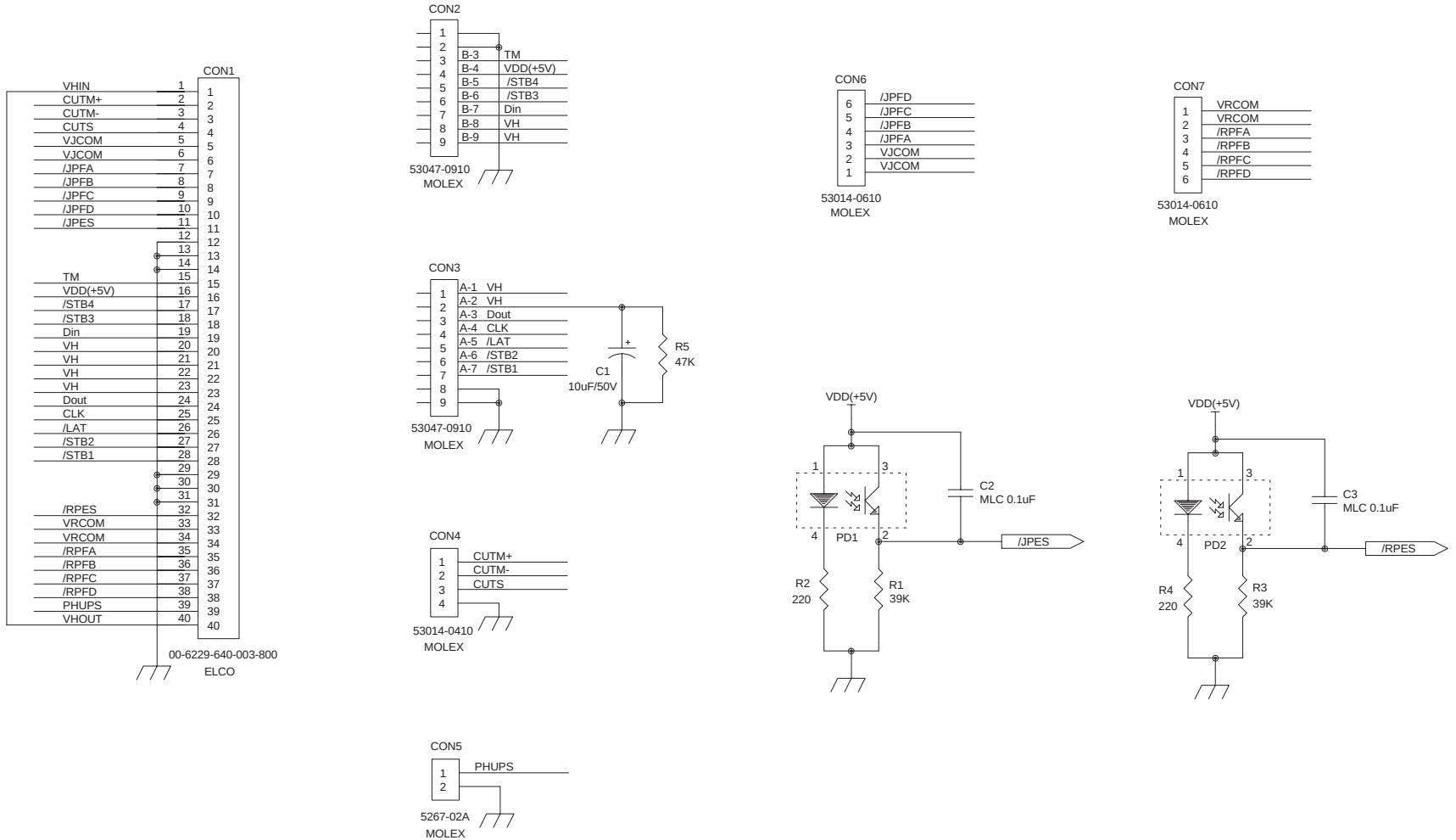
PS PWB

1/1

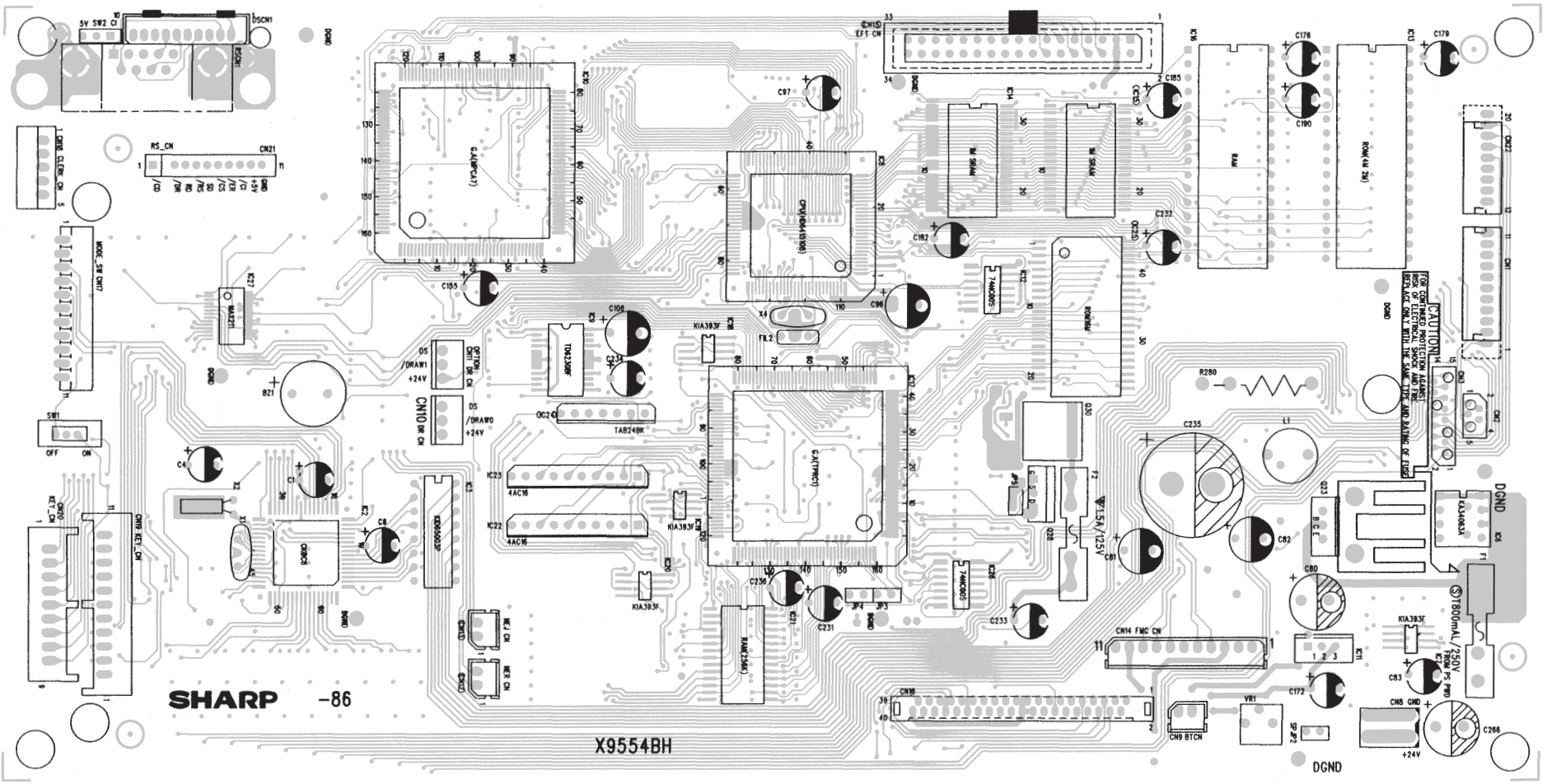

POWER UNIT
CORE
CN1
PS CN
SEMKO T2.5AL/250V
F1
C1
M0.033u
BD1
CP301
CN17
CAR BT CN
(C2)
(4700UF)
(50V)
C5
3300UF
50V
C6
3300UF
50V
R1
18K
C3
22UF/50v
IC1
LM2574HVN
6,8PIN:NC
Q1
KTD998
HEAT SINK
R2
10
D1
PS156R
L1
180uH
R3
22KF
R4
1.2KF
C4
2200uF/50V
+24V
+24V
GND
TO MAIN PWB

THERMAL PRINTER(PR.PWB)

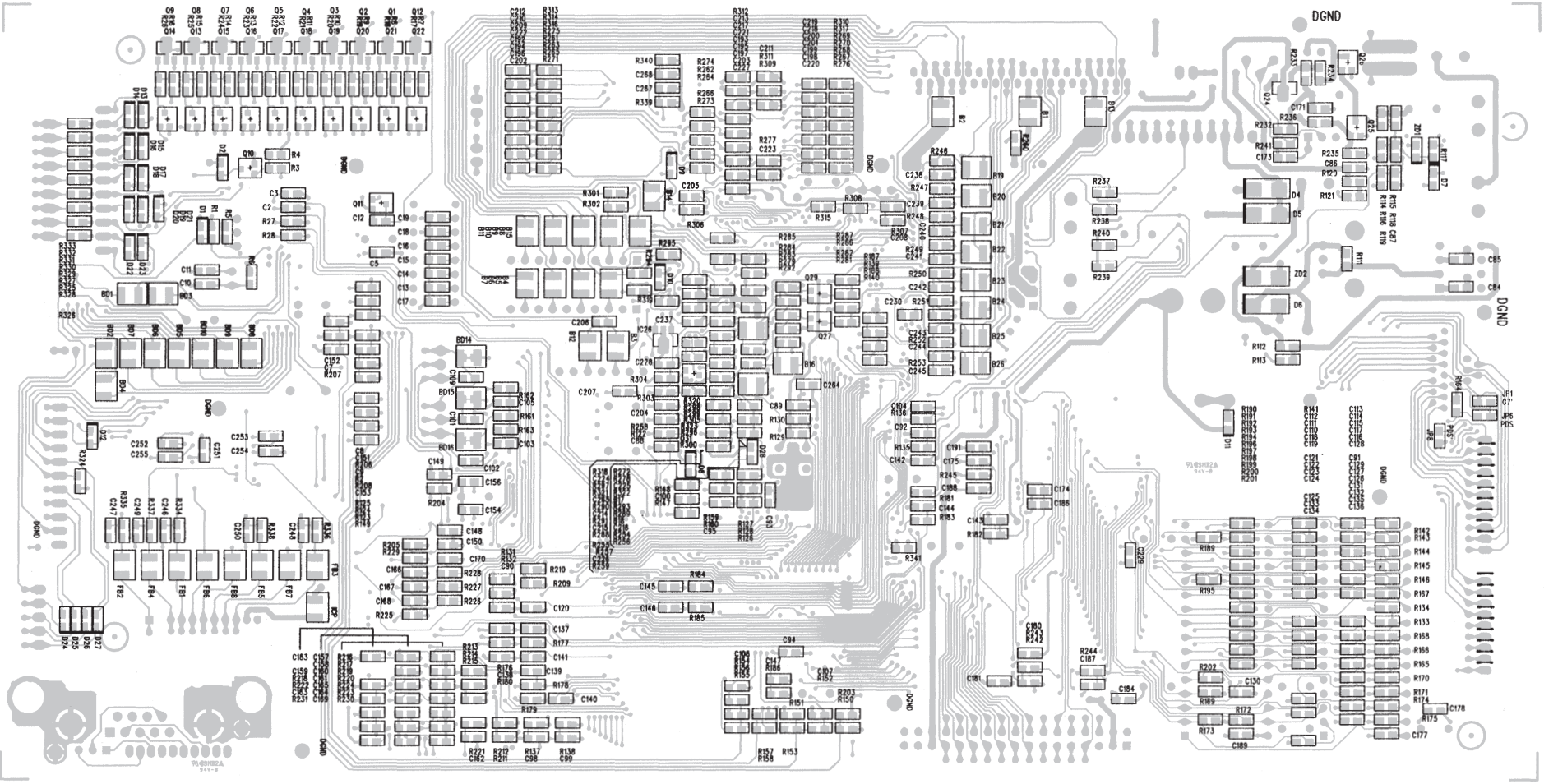
1/1



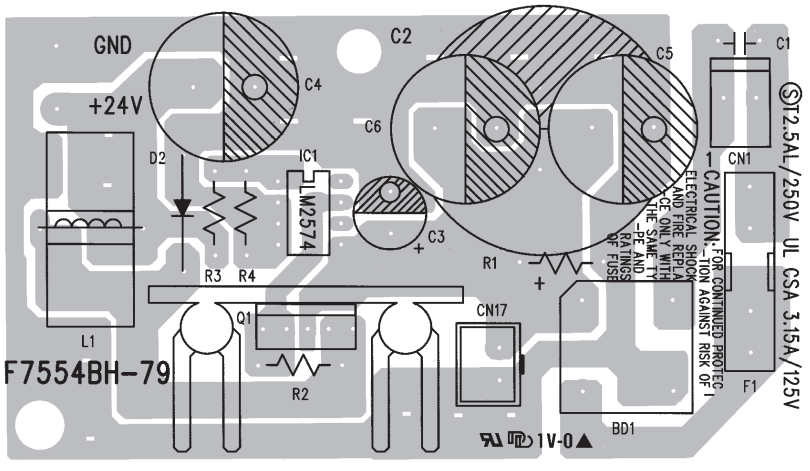
MAIN PWB LAYOUT
(1) SIDE A



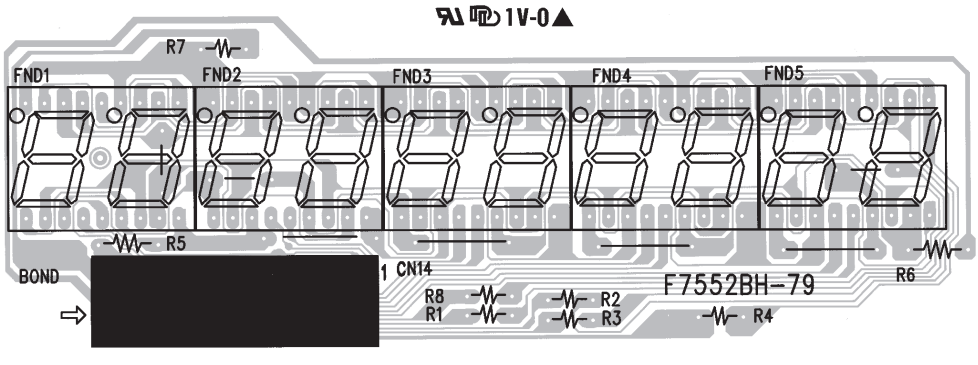
(2) SIDE B



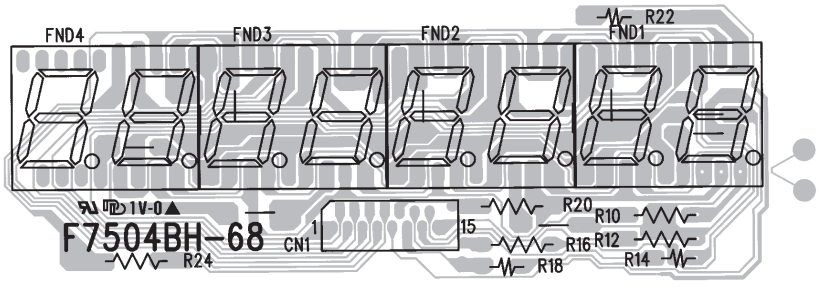
PS PWB



FRONT DISPLAY PWB



POP-UP DISPLAY PWB



SHARP PARTS GUIDE

MODEL ER-A450

PRINTER : PR-45M
SRV key : LKGIM7113BHZZ
(for TQ,TS,KA,KB)

CONTENTS

1 Exteriors
2 Keyboard unit
3 Packing material & Accessories
4 Drawer box unit(SK420 type)
5 Main PWB unit(include Block 6)
6 RS232C PWB
7 PS PWB unit
8 Front LED PWB unit
9 Pop up LED PWB unit
10 Articles for consumption
11 Service route options & Service tools
■ Index

Because parts marked with "⚠ " is indispensable for the machine safety maintenance and poeration, it must be replaced with the parts specific to the product specification.

Table of destinations

SELECTION CODE	COUNTRIES
U	U.S.A., Guam
A	Canada
TS	Germany
TQ	SEEG territory other than Germany (Stamp:English)
TR	SEEG territory other than Germany (Stamp:English)
KB	U.Kingdom
KA	Australia

SELECTION CODE	COUNTRIES
K	Korea

SELECTION CODE	COUNTRIES
SB	Saudi Arabia (127V area)
SBA	Saudi Arabia (220V area)
SC	Taiwan
SD	Venezuela
SE	Hong Kong
SG	Lebanon, Syria, Greece, Pakistan, Iran, Egypt, Thailand, Iraq, Mauritius, Seychelles, Tahiti, Jordan, Sudan, Turkey
SH	South Africa (U.S.A. version)
SHE	South Africa (Europe version)
SJ	Philippines (Europe version)
SJ2	Philippines (U.S.A. version)
SM	Kuwait, Qatar, Oman, UAE, Malta, Bahrain
SMT	Nigeria, Yemen, Kenya

SELECTION CODE	COUNTRIES
RA1	Morocco, Algeria, Tunisia, West Africa
RA2	Chile, Uruguay, Peru, Argentina, Paraguay
RA5	Sri Lanka

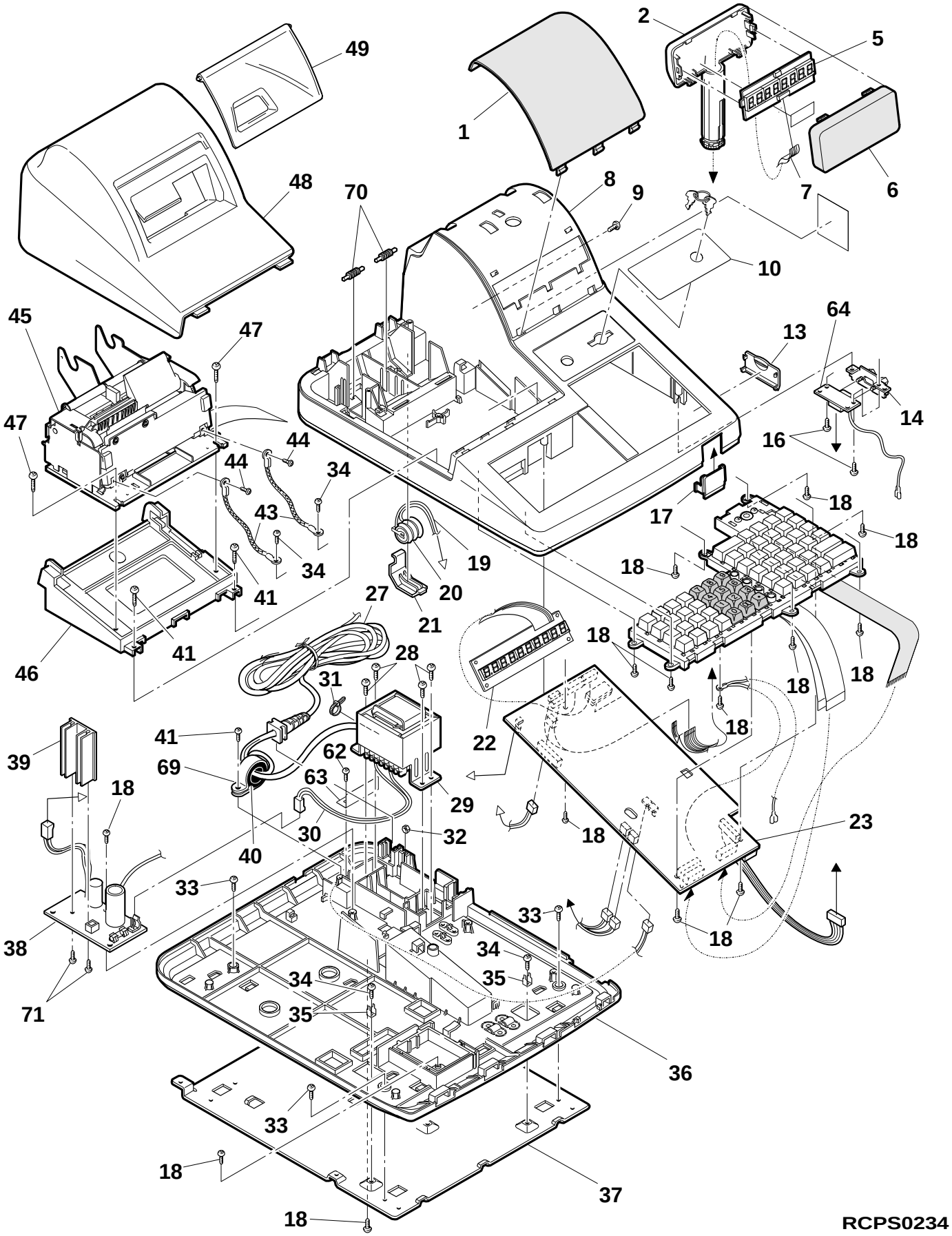
SELECTION CODE	COUNTRIES
RB3	Indonesia
RB4	
RB5	Cyprus
RB6	Panama
RB7	Barbados
RB8	Malaysia (U.S.A. version)

SELECTION CODE	COUNTRIES
RC1	Malaysia (Europe version)
RC2	Singapore
RC5	Dominican Republic, Ecuador

1 Exteriors

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	PFiLW6976BHZZ	AV	N	D	Front filter
2	GCABB7861BHZZ	AN		D	Pop up cabinet
5	CPWBF7504BH01	BC		E	Pop up LED PWB unit (NORMAL)
6	PFiLW6961BHZZ	AP		D	Pop up filter
7	QCNW-7878BHZZ	AK		C	Flat cable (15P)
8	GCABB7857BHZZ	BE		D	Top cabinet
9	XBBSC30P08000	AA		C	Screw (3×8)
10	HDECP6864BHZZ	AN	N	D	Deco panel
13	GCŌVH7144BHZZ	AH		D	RS232C cover
14	LANGK7615BHZZ	AL		C	RS232C angle
16	XUPSD40P10000	AA		C	Screw (4×10)
17	GFTAF6921BHSC	AH		D	Clerk cover A
18	XEBSD30P08000	AA		C	Screw (M3×8)
19	QCNW-7880BHZZ	AF		C	Battery cable
20	UBATZ6661BHZZ	BA		B	Battery
21	GCŌVH7143BHZZ	AH		D	Battery cover
22	CPWBF7552BH01	BC		E	Front LED PWB unit
23	CPWBX9554BH02	CL	N	E	Main PWB unit
⚠ 27	QACCE3120QCN5	AL		B	AC cord (250V 2.5A) [TQ,TS,TR]
⚠ 27	QCNW-1035CCZZ	AL		B	AC cord [KB]
⚠ 27	QPLGA0006QCZZ	AQ		B	Plug (3A 250V) [KB]
⚠ 27	QACCL1018CCN1	AV		B	AC cord (7.5A) [KA]
28	XHBSD40P06000	AA		C	Screw (4×6)
⚠ 29	RTRNP9524BHZZ	BK		B	Power transformer (220V~230V) [TQ,TR,TS]
⚠ 29	RTRNP6898BHZZ	BK	N	B	Power transformer (230V~240V) [KA,KB]
30	QCNW-7872BHZZ	AK		C	PS cable
31	LBNDJ2003SCZZ	AA		C	Cable band
32	XNESD30-24000	AA		C	Nut (M3)
33	LX-BZ6778BHZZ	AA		C	Screw (3×6)
34	XHBSD30P04000	AA		C	Screw (3×4)
35	QTANZ6661BHZZ	AE		C	Faston terminal
36	GCABA7858BHZZ	BB	N	D	Bottom cabinet
37	LCHSM6706BHZZ	BA		C	Main chassis
38	CPWBF7554BH03	BP		E	PS PWB unit
39	PRDAF6666BHZA	AN		C	Heat sink
40	RCŌRF6696BHZZ	AL		C	Core (TC28A152B) (for AC CORD)
41	XEBSD30P10000	AA		C	Screw (3×10)
43	QCNW-7121RCZZ	AD		C	Earth wire
44	XBPSD30P06K00	AA		C	Screw (3×6K)
45	Ki-ŌB2359BHZZ	CA		E	Printer unit (PR-45M)
46	LHLDZ6847BHZZ	AS		C	Printer cushion
47	XJPSD30P12X00	AB		C	Screw (3×12X)
48	GCŌVA7140BHZZ	AZ		D	Printer cover
49	PFiLD6973BHZZ	AS		D	Journal filter (THERMAL)
62	LX-BZ6644BHZZ	AA		C	Screw (M3.5×8S)
63	GCŌVH7147BHZZ	AK		D	PS cover
64	CPWBX9554BH02	CL	N	E	Main PWB unit (RS232C PWB)
69	LBNDJ6636BHZZ	AD		C	Battery band
70	NRŌLP6651BHSC	AE		C	Paper plate roller
71	LX-BZ6644BHZZ	AA		C	Screw (M3.5×8S)

1 Exteriors



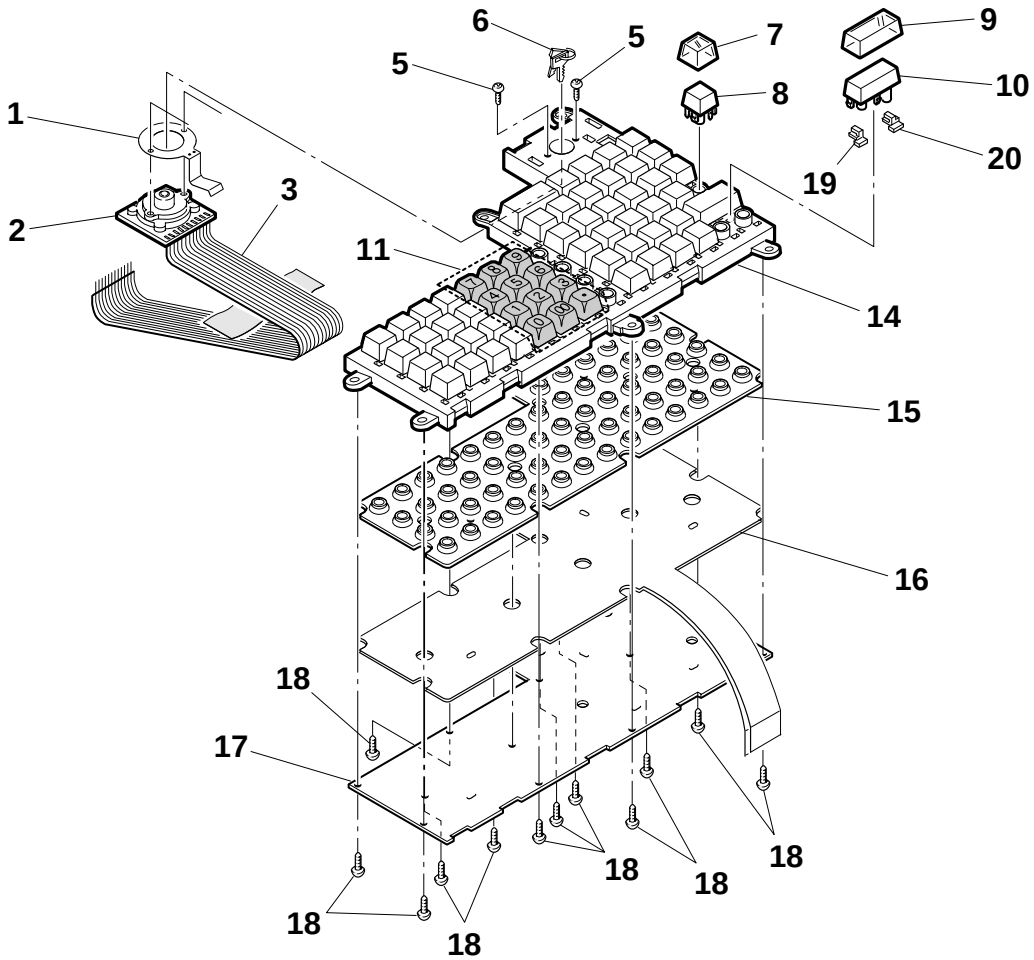
2 Keyboard unit

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	LANGQ7604BHZZ	AG		C	Mode sw angle
2	LKGiW0001BHZZ	AS		B	Mode switch(Body)
3	QCNW-7881BHZZ	AG		C	Mode sw cable
5	XJPSD30P08000	AA		C	Screw (3×8)
6	LKGiM7111BHZZ	AE		B	OP key (OP)
	LKGiM7129BHZZ	AE		B	SM key (SM)
	LKGiM7110BHZZ	AE		B	MA key (MA)
7	JKNBZ6897BHZZ	AG		C	Key cap (1×1)
8	JKNBZ6896BHZA	AG		C	Key top (1×1)
9	JKNBZ6899BHZZ	AH		C	Key cap (1×2)
10	JKNBZ6898BHZZ	AH		C	Key top (1×2)
11	JKNBZ6905BHZZ	AF		C	Key top (0)
	JKNBZ6908BHZZ	AK		C	Key top (.)
	JKNBZ6911BHZZ	AK		C	Key top (1)
	JKNBZ6912BHZZ	AK		C	Key top (2)
	JKNBZ6913BHZZ	AK		C	Key top (3)
	JKNBZ6914BHZZ	AK		C	Key top (4)
	JKNBZ6915BHZZ	AK		C	Key top (5)
	JKNBZ6916BHZZ	AK		C	Key top (6)
	JKNBZ6917BHZZ	AK		C	Key top (7)
	JKNBZ6918BHZZ	AK		C	Key top (8)
	JKNBZ6919BHZZ	AK		C	Key top (9)
	JKNBZ6920BHZZ	AK		C	Key top (00)
14	LFRM-6700BHZZ	BB		D	Key frame
15	PGUMM6725BHZZ	AZ		C	Key rubber
16	PSHEP6854BHZZ	BD		D	Key sheet unit
17	LPLTM6705BHZZ	AX		C	Key plate
18	XJPSD30P06000	AA		C	Screw (3×6)
19	LHLDZ6836BHZZ	AE		C	Holder R
20	LHLDZ6837BHZZ	AE		C	Holder L
101	TLABH7092BHZZ	AP	N	D	Key label
501	DUNTK0247BHZZ	BP	N	E	Key board (except No.1~3,5,6)

3 Packing material & Accessories

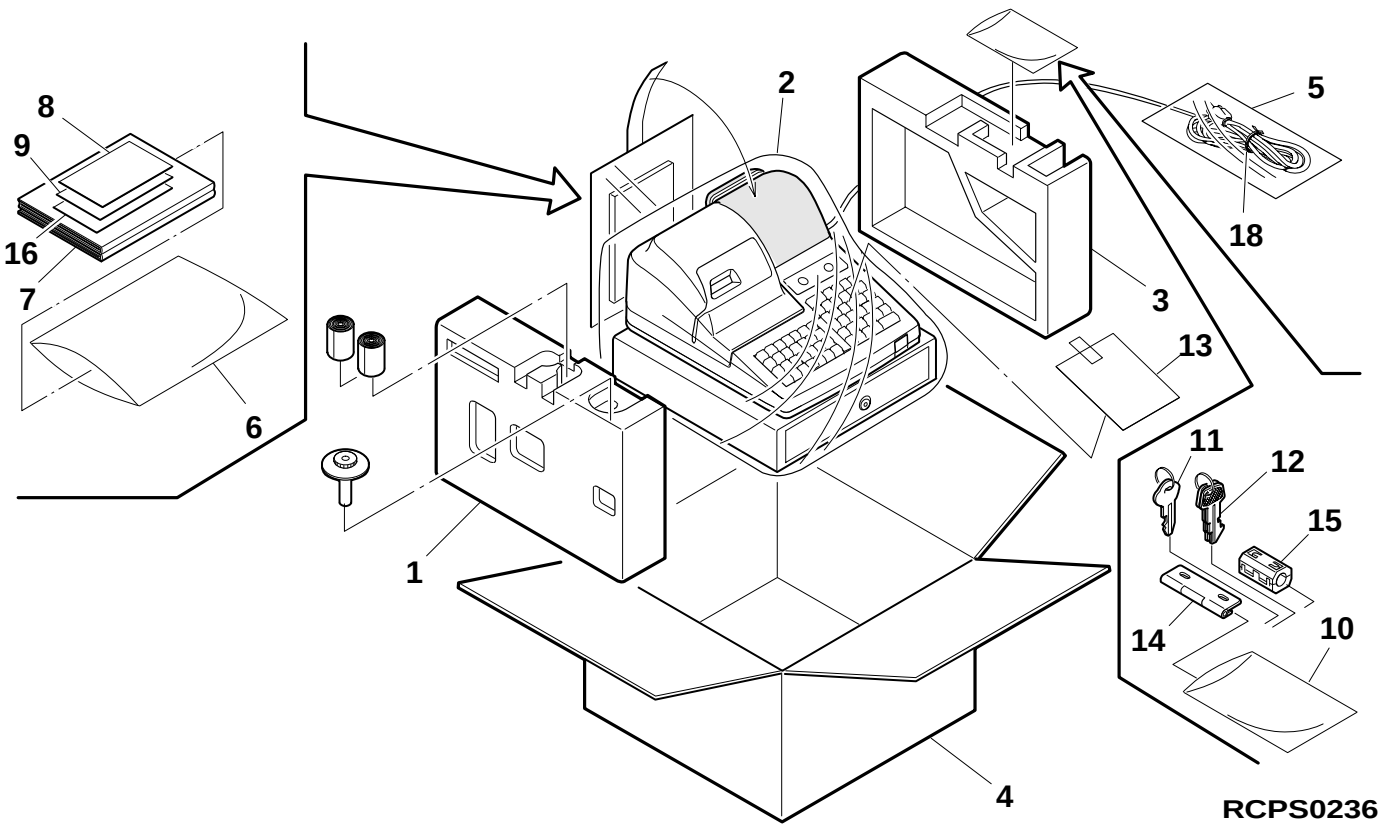
NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	SPAKA8422BHZZ	AX		D	Packing add L [for SK420]
2	PSHEP6681BHZZ	AF		D	Packing sheet
3	SPAKA8421BHZZ	AX		D	Packing add R [for SK420]
4	SPAKC8428BHZZ	AZ	N	D	Packing case
5	SSAKH4231CCZZ	AA		D	Vinyl bag (140×500mm)
6	SSAKH3015CCZZ	AA		D	Vinyl bag (200×300mm) [KA,KB]
	SSAKH0013HCZZ	AA		D	Vinyl sack [TQ,TS]
7	TiNSE7423BHZZ	BD	N	D	Instruction book E
	TiNSF7425BHZZ	BD	N	D	Instruction book F [TQ,TS]
	TiNSG7427BHZZ	BD	N	D	Instruction book G [TQ,TS]
	TiNSS7429BHZZ	BD	N	D	Instruction book S [TQ,TS]
8	TiNSN7240BHZZ	AF		D	Instruction book(Battery adjust) [TQ,TS]
9	TGANE1001BHZC	AG		D	Warranty card [KA]
10	SSAKH3012CCZZ	AA		D	Vinyl bag (80×120mm)
11	LKGiM7331BHZZ	AE		B	Lock key (1pc)
12	LKGiM7111BHZZ	AE		B	OP key (OP)
	LKGiM7129BHZZ	AE		B	SM key (SM)
	LKGiM7110BHZZ	AE		B	MA key (MA)
13	TCADH6788BHZA	AC		D	Caution card (Black)
14	LANGK7613BHZZ	AN		C	Fixing angle B
15	RCŌRF6699BHZZ	AU		C	Core (BNF28)
16	TCADZ2001BHZA	AM		D	Install card [KA]
18	UBNDA6629BHZZ	AA		C	AC coed band

2 Keyboard unit



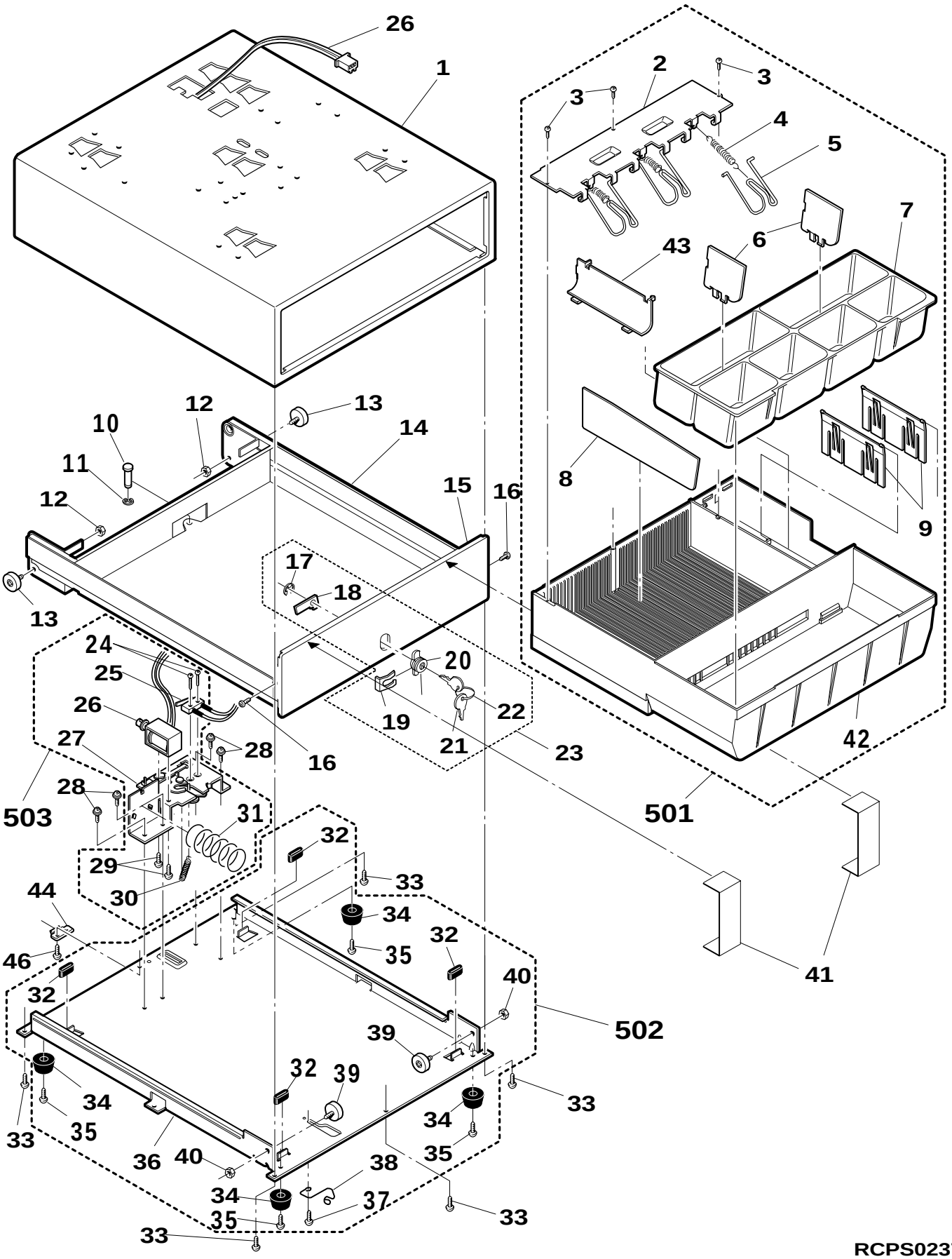
RCPS0235

3 Packing material & Accessories



RCPS0236

4 Drawer box unit(SK420 type)



RCPS0237

4 Drawer box unit(SK420 type)

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	CCABM7863BHZZ	BF		D	Cabinet unit
2	LPLTM6709BHZZ	AS		C	Bracket
3	XUBSD30P08000	AA		C	Screw (3×8)
4	MSPRT6714BHZZ	AE		C	Bill spring
5	MLEVF6695BHZZ	AK		C	Bill lever
6	LPLTP6712BHZZ	AK		C	Coin separator
7	GCASP6701BHZZ	AV		D	Coin case
8	PSKR-6628BHZZ	AG		C	Separator
9	LPLTP6710BHZZ	AK		C	Bill plate
10	LPiN-6650BHZZ	AA		C	Lock pin
11	XRESJ40-06000	AA		C	E type ring (4mm)
12	XNESD60-50000	AA		C	Nut (M6)
13	NRŌLP6650BHZZ	AP		C	Roller
14	CDRW-6681BH02	BE		D	Case frame unit
15	GCŌVA7147BHZZ	AS		D	Front cover
16	XHSSD30P06000	AA		C	Screw (M3×6)
17	XRESJ50-06000	AA		C	E type ring (5mm)
18	MCAMM6633BHZA	AE		C	Lock cam
19	MSPRK6718BHZZ	AF		C	Lock key spring
20	LKGiW7330BHZZ	AY		B	Lock key (body)
21	LKGiM7331BHZZ	AE		B	Lock key (1pc)
22	PRNGT6637BHZZ	AA		C	Key ring
23	DUNT-1306BHZA	AX		E	Lock key unit
24	LX-BZ6776BHZZ	AA		C	Screw
25	QSW-M6872BHZZ	AR		B	Micro switch
26	CPLU-6647BH01	AY		B	Solenoid + Drawer cable
27	CFRM-6701BH01	AY		D	Lock frame unit
28	XBPSD40P06K00	AA		C	Screw (M4×6K)
29	LX-BZ6775BHZZ	AA		C	Screw
30	MSPRT6713BHZZ	AD		C	Open lever spring
31	MSPRC6712BHZZ	AF		C	Push out spring
32	PGUMM6695BHZZ	AE		C	Stopper gum
33	LX-BZ6778BHZZ	AA		C	Screw (3×6)
34	PGUMM6727BHZZ	AE		C	Gum leg
35	XHBSD40P08000	AA		C	Screw (4×8)
36	LPLTM6708BHZZ	BB		C	Bottom plate
37	XHPSC30P08000	AA		C	Screw (3×8)
38	MSPRB6751BHZZ	AF		C	Earth spring
39	NRŌLP6650BHZZ	AP		C	Roller
40	XNESD60-50000	AA		C	Nut (M6)
41	SPAKA8375BHZZ	AD		D	Paper pad
42	GCASP6700BHZZ	BB		D	Money case (5B/8C)
43	LPLTP6711BHZZ	AP		C	Bill guide
44	LANGK7612BHZZ	AF		C	Fixing angle-A
46	XHPSD30P08000	AA		C	Screw (3×8)
501	CCASP6700BHZZ	BH		E	Money case unit (5B/8C)
502	CPLTM6708BH01	BF		E	Bottom plate unit
503	DUNTM5818BHZZ	BE		E	Lock unit (inculde No.24~27,29~31)
504	CDRW-6683BHZZ	BL		E	Drawer case unit (inculde No.10~16)
	(Unit)				
901	GBŌXD7153BHZZ	BY		E	Drawer box unit (5B/8C)

5 Main PWB unit(include Block 6)

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	VHiD780021505	AT		B	IC (CKDC8)(D780021505) [IC2]
2	VHiF258024PC/	AZ		B	IC (F258024PC) [IC17]
3	VHiG76C256F70	BC		B	IC (G76D256F70) [IC21]
4	VHiH641510810	BA		B	IC (H641510810) [IC8]
5	VHiHM128F12SL	BN		B	IC (HM128F12SL) [IC14]
6	VHiKiA393F/-1	AK		B	IC (KIA393F SOP) [IC7,18,19,20]
7	VHiLZ9AH39/-1	BA		B	IC (MPCA7) [IC10]
8	VHiMAX211CAi1	AW		B	IC (MAX211CAI1)(VHIMAX211CAI-) [IC27]
9	VHiSN74HC00DR	AG		B	IC (SN74HC00DR SOP) [IC12,28]
10	VHiTD62308F-1	AH		B	IC (TD62308F) [IC9]
11	VS2SJ328-Z/-1	AP		B	Transistor (2SJ328-Z) [Q30]
12	QFSHD2109AFZZ	AC		C	Fuse holder [F1,2]
13	RCŌRF6702BHZZ	AF		C	EMI filter (100pF) [FIL2]
14	VCEAGA1CW106M	AA		C	Capacitor (16WV 10µF) [C1,4,6,179,182,185,190,236]
15	VCEAGA1CW337M	AB		C	Capacitor (16WV 330µF) [C81,82]
16	VCEAGA1CW476M	AB		C	Capacitor (16WV 47µF) [C95,97,176]
17	VCEAGA1HW105M	AB		C	Capacitor (50WV 1µF) [C83]
18	VCEAGA1HW106M	AA		C	Capacitor (50WV 10µF) [C155]
19	VCEAGA1HW107M	AA		C	Capacitor (50WV 100µF) [C266]
20	VCEAGU2AW106M	AB		C	Capacitor (100WV 10µF) [C233]
21	RCŌRF7002BHZZ	AE		C	Chip core (EFCB322513TS) [BD1,2,3,4,5,6,7,8,9,10]

5 Main PWB unit(include Block 6)

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION	
21	RCŌRF7002BHZZ	AE		C	Chip core (EFCB322513TS)	[FB1,2,3,4,5,6,7,8]
	RCŌRF7002BHZZ	AE		C	Chip core (EFCB322513TS)	[B1,2,4,5,6,7,8,9,10,11,13,14,15,16]
	RCŌRF7002BHZZ	AE		C	Chip core (EFCB322513TS)	[B17,18,19,20,21,22,23,24,25,26]
22	VCCCTV1HH101J	AA		C	Capacitor (50WV 100PF)	[C88,90,91,92,104,110,111,112,113,114,115]
	VCCCTV1HH101J	AA		C	Capacitor (50WV 100PF)	[C116,117,118,119,120,121,122,123,124,125]
	VCCCTV1HH101J	AA		C	Capacitor (50WV 100PF)	[C126,127,128,129,130,131,132,133,134,135]
	VCCCTV1HH101J	AA		C	Capacitor (50WV 100PF)	[C136,137,138,139,140,141,170,180,183,186]
	VCCCTV1HH101J	AA		C	Capacitor (50WV 100PF)	[C187,191,216]
23	VCCCTV1HH220J	AA		C	Capacitor (50WV 22PF)	[C11]
24	VCCCTV1HH221J	AA		C	Capacitor (50WV 220PF)	[C85]
25	VCCCTV1HH270J	AC		C	Capacitor (50WV 27pF)	[C10]
26	VCCCTV1HH331J	AA		C	Capacitor (50WV 330PF)	[C2,7,8,9,98,99,145,146,147,149,150,151,152]
	VCCCTV1HH331J	AA		C	Capacitor (50WV 330PF)	[C153,157,158,159,160,161,162,163,164,165]
	VCCCTV1HH331J	AA		C	Capacitor (50WV 330PF)	[C169,205,237,238,239,240,241,242,243,244]
	VCCCTV1HH331J	AA		C	Capacitor (50WV 330PF)	[C245]
27	VCCCTV1HH470J	AA		C	Capacitor (50WV 47PF)	[C89,192,193,194,195,196,197,198,199,200]
	VCCCTV1HH470J	AA		C	Capacitor (50WV 47PF)	[C201,202,203,204,208,209,210,211,212,213]
	VCCCTV1HH470J	AA		C	Capacitor (50WV 47PF)	[C214,215,217,218,219,220,221,222,223,224]
	VCCCTV1HH470J	AA		C	Capacitor (50WV 47PF)	[C225,227]
28	VCKYTV1HB102K	AA		C	Capacitor (50WV 1000PF)	[C12,13,14,15,16,17,18,19,87,105,107,108]
	VCKYTV1HB102K	AA		C	Capacitor (50WV 1000PF)	[C142,143,144,166,167,168,174,175,188,228]
	VCKYTV1HB102K	AA		C	Capacitor (50WV 1000PF)	[C246,247,248,249,250]
29	VCKYTV1HB103K	AB		C	Capacitor (50WV 0.010µF)	[C148]
30	VCKYTV1HB222K	AA		C	Capacitor (50WV 2200pF)	[C3]
31	VCKYTV1HF104Z	AA		C	Capacitor (50WV 0.10µF)	[C5,84,86,93,94,95,101,102,103,109,154,156]
	VCKYTV1HF104Z	AA		C	Capacitor (50WV 0.10µF)	[C177,178,181,184,189]
	VCKYTV1HF104Z	AA		C	Capacitor (50WV 0.10µF)	[C226,230,251,252,253,254]
	VCKYTV1HF104Z	AA		C	Capacitor (50WV 0.10µF)	[C255,264,265,267,268]
32	VHEPTZ6.2A／－1	AH		B	Zener diode (PTZ6.2A)	[ZD2]
33	VHEUDZ5.1B／－1	AC		B	Zener diode (UDZ5.1B)	[ZD1]
34	VHD1SR154401	AB		B	Diode (1SR1544001)	[D4,5]
35	VHD1SS353／／－1	AB		B	Diode (1SS353)	[D1,2,8,9,10,12,13,14,15,16,17,18]
	VHD1SS353／／－1	AB		B	Diode (1SS353)	[D19,20,21,22,23,24,25,26,27,28]
36	VHDSFPL52V／－1	AC		B	Diode (SFPL52V)	[D6]
37	VHiKiA431F／－1	AK		B	IC (KIA431F)	[IC26]
38	VRS－TS2AD000J	AA		C	Resistor (1/10W 0Ω ±5%)	[R243,307,150,157]
	VRS－TS2AD000J	AA		C	Resistor (1/10W 0Ω ±5%)	[JP1]
39	VRS－TS2AD100J	AA		C	Resistor (1/10W 10Ω ±5%)	[R111]
40	VRS－TS2AD101J	AA		C	Resistor (1/10W 100Ω ±5%)	[R131,133,135,139,140,141,142,143,144,145]
	VRS－TS2AD101J	AA		C	Resistor (1/10W 100Ω ±5%)	[R146,181,182,183,226,227,228,334,335,336]
	VRS－TS2AD101J	AA		C	Resistor (1/10W 100Ω ±5%)	[R337,338]
41	VRS－TS2AD102F	AA		C	Resistor (1/10W 1KΩ ±1%)	[R113]
42	VRS－TS2AD102J	AA		C	Resistor (1/10W 1.0KΩ ±5%)	[R127,128,289,290,291,292,293,296,297,298]
	VRS－TS2AD102J	AA		C	Resistor (1/10W 1.0KΩ ±5%)	[R299,303,308,320,321,322,323]
43	VRS－TS2AD103J	AA		C	Resistor (1/10W 10KΩ ±5%)	[R1,27,28,122,130,132,134,136,137,138,154]
	VRS－TS2AD103J	AA		C	Resistor (1/10W 10KΩ ±5%)	[R152,165,166,167,168,169,170,171,172,173]
	VRS－TS2AD103J	AA		C	Resistor (1/10W 10KΩ ±5%)	[R174,175,176,177,178,179,180,184,185,186]
	VRS－TS2AD103J	AA		C	Resistor (1/10W 10KΩ ±5%)	[R187,188,189,190,191,192,193,194,195,196]
	VRS－TS2AD103J	AA		C	Resistor (1/10W 10KΩ ±5%)	[R197,198,199,200,201,202,205,206,207]
	VRS－TS2AD103J	AA		C	Resistor (1/10W 10KΩ ±5%)	[R208,209,210,211,212,213,214,215,216,217]
	VRS－TS2AD103J	AA		C	Resistor (1/10W 10KΩ ±5%)	[R218,219,220,221,222,223,224,225,229,230]
	VRS－TS2AD103J	AA		C	Resistor (1/10W 10KΩ ±5%)	[R231,244,245,246,247,248,249,250]
	VRS－TS2AD103J	AA		C	Resistor (1/10W 10KΩ ±5%)	[R251,252,253,261,262,263,264,265,266,267]
	VRS－TS2AD103J	AA		C	Resistor (1/10W 10KΩ ±5%)	[R268,269,270,271,272,273,274,275,276,277]
	VRS－TS2AD103J	AA		C	Resistor (1/10W 10KΩ ±5%)	[R278,285,287,288,309,310,311]
	VRS－TS2AD103J	AA		C	Resistor (1/10W 10KΩ ±5%)	[R312,313,314,316,317]
	VRS－TS2AD103J	AA		C	Resistor (1/10W 10KΩ ±5%)	[R153,155]
44	VRS－TS2AD104J	AA		C	Resistor (1/10W 100KΩ ±5%)	[R294,301,339,340]
46	VRS－TS2AD123J	AA		C	Resistor (1/10W 12KΩ ±5%)	[R4,7,8,9,10,11,12,13,14,15,16]
47	VRS－TS2AD151J	AA		C	Resistor (1/10W 150Ω ±5%)	[R120]
48	VRS－TS2AD153G	AA		C	Resistor (1/10W 15KΩ ±2%)	[R115]
49	VRS－TS2AD163F	AA		C	Resistor (1/10W 16KΩ ±1%)	[R148,159]
50	VRS－TS2AD181J	AA		C	Resistor (1/10W 180Ω ±5%)	[R121]
51	VRS－TS2AD183F	AA		C	Resistor (1/10W 18KΩ ±1%)	[R254]
52	VRS－TS2AD203J	AA		C	Resistor (1/10W 20KΩ ±5%)	[R260]
53	VRS－TS2AD221J	AA		C	Resistor (1/10W 220Ω ±5%)	[R17,18,19,20,21,22,23,24,25,26]
54	VRS－TS2AD222J	AA		C	Resistor (1/10W 2.2KΩ ±5%)	[R3,284]
55	VRS－TS2AD223J	AA		C	Resistor (1/10W 22KΩ ±5%)	[R161]
56	VRS－TS2AD241J	AA		C	Resistor (1/10W 240Ω ±5%)	[R304]
57	VRS－TS2AD272J	AA		C	Resistor (1/10W 2.7KΩ ±5%)	[R117,119]
58	VRS－TS2AD331J	AA		C	Resistor (1/10W 330Ω ±5%)	[R2]
60	VRS－TS2AD333J	AA		C	Resistor (1/10W 33KΩ ±5%)	[R295,302]
61	VRS－TS2AD334J	AA		C	Resistor (1/10W 330KΩ ±5%)	[R6]
62	VRS－TS2AD362F	AA		C	Resistor (1/10W 3.6KΩ ±1%)	[R112,147,160]
64	VRS－TS2AD472J	AA		C	Resistor (1/10W 4.7KΩ ±5%)	[R123,124,125,126,149,164,256,259,305,306]
65	VRS－TS2AD473J	AA		C	Resistor (1/10W 47KΩ ±5%)	[R162,163,324,325,326,327,328,329,330,331]
	VRS－TS2AD473J	AA		C	Resistor (1/10W 47KΩ ±5%)	[R332,333]
66	VRS－TS2AD562J	AA		C	Resistor (1/10W 5.6KΩ ±5%)	[R286,300,318,319]
67	VRS－TS2AD563J	AA		C	Resistor (1/10W 56KΩ ±5%)	[R118]
68	VRS－TS2AD680F	AA		C	Resistor (1/10W 68Ω ±1%)	[R255]

5 Main PWB unit(include Block 6)

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
70	VRS-TS2AD822G	AA		C	Resistor (1/10W 8.2KΩ ±2%) [R114]
71	VRS-TS2AD912G	AA		C	Resistor (1/10W 9.1KΩ ±2%) [R116]
72	VRSTS2AD1151F	AA		C	Resistor (1/10W 1.15KΩ ±1%) [R257]
73	VRSTS2AD1330F	AA		C	Resistor (1/10W 133Ω ±1%) [R258]
74	VS2SA1036KQRC	AB		B	Transistor (2SA1036KQRC) [Q31]
75	VS2SC2412K//-1	AB		B	Transistor (2SC2412K) [Q10,29]
76	VSKRC106S//-1	AD		B	Transistor (KRC106S) [Q11,13,14,15,16,17,18,19,20,21,22]
77	VSKTA1663//-1	AE		B	Transistor (KTA1663) [Q1,2,3,4,5,6,7,8,9,12]
79	QCNCM1101CCZZ	AB		C	Connector (2pin)(QCNCM1101BHZZ) [CN8]
81	QCNCW2423BH0E	AE		C	Connector (5P)(5268-05A) [CN18]
82	QCNCM7057RCZZ	AB		C	Connector (3pin)(QCNCM7057BHZZ) [CN10,11]
83	QCNCM7207BH4J	AQ		C	Connector (40pin)(6229ZIF) [CN16]
84	QCNCW6882BH1A	AG		C	Connector (11P)(52011-1110) [CN17]
85	QCNCW7081BHZZ	AB		C	Connector (2P)(5267-02A)(Blue) [CN9]
86	QCNCW7118BH0i	AG		C	Connector (K/B)(9P)(5229-09CPB) [CN20]
87	QCNCW7118BH1A	AG		C	Connector (K/B)(11P)(5229-11CPB) [CN19]
89	QCNCW7201BH1E	AK		C	Connector (15P)(52806-1510) [CN3]
90	QCNCW7246BH0H	AG		C	Connector (8P)(52007-0810) [CN22]
91	QCNCW7245BH1J	AG		C	Connector (10P)(52007-1010) [CN1]
92	QCNW-7876BHZZ	AQ		C	DS CN cable [CN21]
93	QCNW-7889BHZZ	AG		C	GND wire (M.PWB~K/B,DRAWER) [DGND]
⚠ 94	QFS-C4301CCZZ	AE		A	Fuse (0.8A/250V)(QFS-C4301BHZZ) [F1]
⚠ 95	QFS-A1037CCZZ	AC		A	Fuse (1.5A/120V)(MINI TYPE) [F2]
96	QSŌCZ2042SC32	AE		C	IC socket (32pin) [IC13,16]
97	QSW-S0744AFZZ	AG		B	Reset switch (SSS312) [SW1]
98	RALMB6645RCZZ	AH		B	Buzzer (QMX05)(RALMB6646BHZZ) [BZ1]
99	RCiLC6647RCZZ	AE		C	Coil (220µH)(RCH-110)(RCILC6647BHZZ) [L1]
100	RCRSP6664RCZZ	AF		B	Crystal (19.66MHz) [X4]
101	RCRSP6676RCZZ	AG		B	Crystal (32.768KHz) [X2]
102	RCRSZ6644RCZZ	AD		B	Crystal (4.19MHz) [X1]
103	RVR-M5318QCZZ	AC		B	Variable resistor (5K)(8V3P) [VR1]
104	VCEAGA1HW228M	AB		C	Capacitor (50WV 2200µF) [C235]
105	VCEAGU1CW108M	AD		C	Capacitor (16WV 1000µF) [C80]
106	VHi27040RBK1A	BM	N	B	IC (EP ROM)(4M TI27C040-10) [IC13]
107	VHi4AC16///-1	AK		B	IC (4AC16) [IC22,23]
108	VHiKA34063A-1	AP		B	IC (KA34063A) [IC6]
110	VHiTD62503F-1	AF		B	IC (TD62503F)(VHIKID65003AP) [IC3]
111	VS2SC4153-/-1	AG		B	Transistor (2SC4153) [Q23]
112	PRDAF6656BHZZ	AK		C	Heat sink [Q23]
113	XBPSD30P06000	AA		C	Screw (3×6) [Q23]
114	VHViCPS0.5/-1	AF		B	IC protector (ICPS0.5) [ICP]
115	VRS-TQ2BB000J	AA		C	Resistor (1/8W 0Ω ±5%) [ICP]
	(Unit)				
901	CPWBX9554BH02	CL	N	E	Main PWB unit

6 RS232C PWB

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	QCNCM1060AC03	AB		C	Connector (Short Pin 3P) [SW2]
2	QCNCM7125BH0i	AN		C	Connector ((9P) MLX 87023-6066) [RS CN1]
3	QCNCM7176BH1J	AD		C	Connector (53014-1010)(10pin) [DS CN1]
4	QCNCW1057ACZZ	AB		C	Connector (Short socket) [SW2]
5	QCNW-7914BHZZ	AF		C	GND wire (RS PWB~Drawer) [DS CN1]

7 PS PWB unit

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	RCŌRF6698BHZZ	AR		C	Core (SC18B) [PS DC CABLE]
2	VRD-RC2EY122G	AA		C	Resistor (1/10W 1.2KΩ ±2%)(VRD-RC2EY122F) [R4]
3	VRD-RC2EY183J	AA		C	Resistor (1/4W 18KΩ ±5%) [R1]
4	VRD-RC2EY223G	AA		C	Resistor (1/10W 22KΩ ±2%)(VRD-RC2EY223F) [R3]
5	VRG-ST2EJ100J	AC		B	Fuse resistor (1/4W 10Ω ±5%) [R2]
6	VHDPS156///-1	AE		B	Diode (PS156R) [D2]
7	QFSHD2109AFZZ	AC		C	Fuse holder [F1]
8	VCEAGA1HW226M	AB		C	Capacitor (50WV 22µF) [C3]
9	VCQYNA1HM333K	AA		C	Capacitor (50WV 0.033µF) [C1]
10	LX-BZ6644BHZZ	AA		C	Screw (M3.5×8S) (for heat sink)[Q1]
11	PRDAF6666BHZA	AN		C	Heat sink [Q1]
12	QCNCM1101BHZZ	AC		C	Connector (5273-2)(2P) [CN1]
13	QCNCW7242BH0B	AD		C	Connector (35313-0210) [CN17]
14	QCNW-7886BHZZ	AG		C	GND wire [PWB~TRANS]
15	QCNW-7915BHZZ	AL		C	PS DC cable [+24V,GND]

7 PS PWB unit

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
⚠ 16	QFS-C2521TAZZ	AE		A	Fuse (250V 2.5A) [F1]
17	RCiLC6653BHZZ	AS		C	Choke coil (180μH) [L1]
18	VCEAGA1HW228M	AB		C	Capacitor (50WV 2200μF) [C4]
19	VCEAGU1HW338M	AT		C	Capacitor (50WV 3300μF) [C5,6]
20	VHDCP301///-1	AL		B	Diode (CP301) [BD1]
21	VHiLM2574-ADJ	AU		B	IC (LM2574HVN-ADJ) [IC1]
22	VSKTD998///-1	AS		B	Transistor (2SD998) [Q1]
23	XBPSD30P06000	AA		C	Screw (M3×6) [Q1]
	(Unit)				
901	CPWBF7554BH03	BP		E	PS PWB unit

8 Front LED PWB unit

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	VRD-RC2EY300J	AA		C	Resistor (1/4W 30Ω ±5%) [R1~8]
2	QCNW-7877BHZZ	AN		C	Front LED cable (18P)
3	VHPHDSP5621-1	AM		B	LED (HDSP5621) [FND1~5]
	(Unit)				
901	CPWBF7552BH01	BC		E	Front LED PWB unit

9 Pop up LED PWB unit

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	VRD-RC2EY270J	AA		C	Resistor (1/4W 27Ω ±5%) [R10,12,14,16,18,20,22,24]
2	VHPHDSP5621-1	AM		B	LED (2SEG)(HDSP5621-) [FND1~14]
3	QCNCW7202BH1E	AK		C	Connector (52807-1510) [CN1]
	(Unit)				
901	CPWBF7504BH01	BC		E	Pop up LED PWB unit (NORMAL)

10 Articles for consumption

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	TPAPR6645RC05	AY		S	Roll paper (5rolls/pack)

11 Service route options & Service tools

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
1	LKGiM7113BHZZ	AF		S	Service key
2	LKGiM7126RCZZ	AL		S	Mode key grip cover
3	GCŌVH7126BHZZ	BE		S	Drip-proof keyboard cover (include the switch cover)
4	DUNTK3677BH03	BB		S	Journal near end sensor unit [Q'ty:1]
	XEBSD30P08000	AA		C	Screw (3×8) (Sensor unit-Top cabinet)[Q'ty:1]
	XHBSD30P04000	AA		C	Screw (3×4) (Sensor unit-Earth wire-Top cabinet)[Q'ty:1]
	LX-BZ6778BHZZ	AA		C	Screw (Earth wire-Top cabinet)[Q'ty:1]
	QCNW-7895BHZZ	AF		S	Earth wire [Q'ty:1]
	QCNCM6865RC0B	AA		C	Coneector (2pin) [Q'ty:1]
5	GCŌVB7153BHZZ	BH		S	Text preset keyboard cover
6	DKiT-8669BHZZ			S	One hole cashier key (include No.101~116)
7	DKiT-8673BHZZ		N	S	ER-01EF connecting kit (include No.201~205)
11	UKŌG-6705RCZZ	BC		S	RS-232 loop back connector
12	UKŌG-6634RCZZ	AX		S	Key top remover
13	UKŌG-6725BHZZ	BB		S	Key top installing jig (2×2)
101	LKGiM1004BH01	AW		S	Clerk key(1) (2pcs/1set,with key ring)
102	LKGiM1004BH02	AW		S	Clerk key(2) (2pcs/1set,with key ring)
103	LKGiM1004BH03	AW		S	Clerk key(3) (2pcs/1set,with key ring)
104	LKGiM1004BH04	AW		S	Clerk key(4) (2pcs/1set,with key ring)
105	LKGiM1004BH05	AW		S	Clerk key(5) (2pcs/1set,with key ring)
106	LKGiM1004BH06	AW		S	Clerk key(6) (2pcs/1set,with key ring)
107	LKGiM1004BH07	BH		S	Clerk key(7) (2pcs/1set,with key ring)
108	LKGiM1004BH08	BH		S	Clerk key(8) (2pcs/1set,with key ring)
109	LKGiM1004BH09	BH		S	Clerk key(9) (2pcs/1set,with key ring)
110	LKGiM1004BH10	BH		S	Clerk key(10) (2pcs/1set,with key ring)
111	LKGiM1004BH11	BH		S	Clerk key(11) (2pcs/1set,with key ring)
112	LKGiM1004BH12	BH		S	Clerk key(12) (2pcs/1set,with key ring)

11 Service route options & Service tools

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
113	LKGiM1004BH13	BH		S	Clerk key(13) (2pcs/1set,with key ring)
114	LKGiM1004BH14	BH		S	Clerk key(14) (2pcs/1set,with key ring)
115	LKGiM1004BH15	BH		S	Clerk key(15) (2pcs/1set,with key ring)
116	GFTAF6922BHSC	AH		S	Clerk cover B
201	LANGT2779BHZZ	AP	N	C	Fet angle
202	XEBSD30P08000	AA		C	Screw (M3×8)
203	QCNW-7925BHZZ	BF	N	C	Connector with wire (34pin)
204	QCNCW7243BH3D	AV		C	Connector (34pin)
205	QCNW-7926BHZZ	AF	N	C	GND wire

■ Index

PARTS CODE	NO.	PRICE RANK	NEW MARK	PART RANK	
【C】					
CCABM7863BHZZ	4- 1	BF		D	
CCASP6700BHZZ	4-501	BH		E	
CDRW-6681BH02	4- 14	BE		D	
CDRW-6683BHZZ	4-504	BL		E	
CFRM-6701BH01	4- 27	AY		D	
CPLTM6708BH01	4-502	BF		E	
CPLU-6647BH01	4- 26	AY		B	
CPWBF7504BH01	1- 5	BC		E	
〃	9-901	BC		E	
CPWBF7552BH01	1- 22	BC		E	
〃	8-901	BC		E	
CPWBF7554BH03	1- 38	BP		E	
〃	7-901	BP		E	
CPWBX9554BH02	1- 23	CL	N	E	
〃	1- 64	CL	N	E	
〃	5-901	CL	N	E	
【D】					
DKiT-8669BHZZ	11- 6			S	
DKiT-8673BHZZ	11- 7		N	S	
DUNT-1306BHZA	4- 23	AX		E	
DUNTK0247BHZZ	2-501	BP	N	E	
DUNTK3677BH03	11- 4	BB		S	
DUNTM5818BHZZ	4-503	BE		E	
【G】					
GBŌXD7153BHZZ	4-901	BY		E	
GCABA7858BHZZ	1- 36	BB	N	D	
GCABB7857BHZZ	1- 8	BE		D	
GCABB7861BHZZ	1- 2	AN		D	
GCASP6700BHZZ	4- 42	BB		D	
GCASP6701BHZZ	4- 7	AV		D	
GCŌVA7140BHZZ	1- 48	AZ		D	
GCŌVA7147BHZZ	4- 15	AS		D	
GCŌVB7153BHZZ	11- 5	BH		S	
GCŌVH7126BHZZ	11- 3	BE		S	
GCŌVH7143BHZZ	1- 21	AH		D	
GCŌVH7144BHZZ	1- 13	AH		D	
GCŌVH7147BHZZ	1- 63	AK		D	
GFTAF6921BHSC	1- 17	AH		D	
GFTAF6922BHSC	11-116	AH		S	
【H】					
HDECP6864BHZZ	1- 10	AN	N	D	
【J】					
JKNBZ6896BHZA	2- 8	AG		C	
JKNBZ6897BHZZ	2- 7	AG		C	
JKNBZ6898BHZZ	2- 10	AH		C	
JKNBZ6899BHZZ	2- 9	AH		C	
JKNBZ6905BHZZ	2- 11	AF		C	
JKNBZ6908BHZZ	2- 11	AK		C	
JKNBZ6911BHZZ	2- 11	AK		C	
JKNBZ6912BHZZ	2- 11	AK		C	
JKNBZ6913BHZZ	2- 11	AK		C	
JKNBZ6914BHZZ	2- 11	AK		C	
JKNBZ6915BHZZ	2- 11	AK		C	
JKNBZ6916BHZZ	2- 11	AK		C	
JKNBZ6917BHZZ	2- 11	AK		C	
JKNBZ6918BHZZ	2- 11	AK		C	
JKNBZ6919BHZZ	2- 11	AK		C	
JKNBZ6920BHZZ	2- 11	AK		C	
【K】					
Ki-ŌB2359BHZZ	1- 45	CA		E	
【L】					
LANGK7612BHZZ	4- 44	AF		C	
LANGK7613BHZZ	3- 14	AN		C	
LANGK7615BHZZ	1- 14	AL		C	
LANGQ7604BHZZ	2- 1	AG		C	
LANGT2779BHZZ	11-201	AP	N	C	
LBNDJ2003SCZZ	1- 31	AA		C	
LBNDJ6636BHZZ	1- 69	AD		C	
LCHSM6706BHZZ	1- 37	BA		C	
LFRM-6700BHZZ	2- 14	BB		D	
LHLDZ6836BHZZ	2- 19	AE		C	
LHLDZ6837BHZZ	2- 20	AE		C	
LHLDZ6847BHZZ	1- 46	AS		C	
LKGiM1004BH01	11-101	AW		S	
LKGiM1004BH02	11-102	AW		S	
LKGiM1004BH03	11-103	AW		S	
LKGiM1004BH04	11-104	AW		S	
LKGiM1004BH05	11-105	AW		S	
LKGiM1004BH06	11-106	AW		S	
LKGiM1004BH07	11-107	BH		S	
LKGiM1004BH08	11-108	BH		S	
LKGiM1004BH09	11-109	BH		S	
LKGiM1004BH10	11-110	BH		S	
LKGiM1004BH11	11-111	BH		S	
LKGiM1004BH12	11-112	BH		S	
LKGiM1004BH13	11-113	BH		S	
LKGiM1004BH14	11-114	BH		S	
LKGiM1004BH15	11-115	BH		S	
LKGiM7110BHZZ	2- 6	AE		B	
〃	3- 12	AE		B	
LKGiM7111BHZZ	2- 6	AE		B	
〃	3- 12	AE		B	
LKGiM7113BHZZ	11- 1	AF		S	
LKGiM7126RCZZ	11- 2	AL		S	
LKGiM7129BHZZ	2- 6	AE		B	
〃	3- 12	AE		B	
LKGiM7331BHZZ	3- 11	AE		B	
〃	4- 21	AE		B	
LKGiW0001BHZZ	2- 2	AS		B	
LKGiW7330BHZZ	4- 20	AY		B	
LPiN-6650BHZZ	4- 10	AA		C	
LPLTM6705BHZZ	2- 17	AX		C	
LPLTM6708BHZZ	4- 36	BB		C	
LPLTM6709BHZZ	4- 2	AS		C	
LPLTP6710BHZZ	4- 9	AK		C	
LPLTP6711BHZZ	4- 43	AP		C	
LPLTP6712BHZZ	4- 6	AK		C	
LX-BZ6644BHZZ	1- 62	AA		C	
〃	1- 71	AA		C	
〃	7- 10	AA		C	
LX-BZ6775BHZZ	4- 29	AA		C	
LX-BZ6776BHZZ	4- 24	AA		C	
LX-BZ6778BHZZ	1- 33	AA		C	
〃	4- 33	AA		C	
〃	11- 4	AA		C	
【M】					
MCAMM6633BHZA	4- 18	AE		C	
MLEVF6695BHZZ	4- 5	AK		C	
MSPRB6751BHZZ	4- 38	AF		C	
MSPRC6712BHZZ	4- 31	AF		C	
MSPRK6718BHZZ	4- 19	AF		C	
MSPRT6713BHZZ	4- 30	AD		C	
MSPRT6714BHZZ	4- 4	AE		C	
【N】					
NRŌLP6650BHZZ	4- 13	AP		C	
〃	4- 39	AP		C	
NRŌLP6651BHSC	1- 70	AE		C	
【P】					
PFiLD6973BHZZ	1- 49	AS		D	
PFiLW6961BHZZ	1- 6	AP		D	
PFiLW6976BHZZ	1- 1	AV	N	D	
PGUMM6695BHZZ	4- 32	AE		C	
PGUMM6725BHZZ	2- 15	AZ		C	
PGUMM6727BHZZ	4- 34	AE		C	
PRDAF6656BHZZ	5-112	AK		C	
PRDAF6666BHZA	1- 39	AN		C	
〃	7- 11	AN		C	
PRNGT6637BHZZ	4- 22	AA		C	
PSHEP6681BHZZ	3- 2	AF		D	
PSHEP6854BHZZ	2- 16	BD		D	
PSKR-6628BHZZ	4- 8	AG		C	
【Q】					
QACCE3120QCN5	1- 27	AL		B	
QACCL1018CCN1	1- 27	AV		B	
QCNCM1060AC03	6- 1	AB		C	
QCNCM1101BHZZ	7- 12	AC		C	
QCNCM1101CCZZ	5- 79	AB		C	
QCNCM6865RC0B	11- 4	AA		C	
QCNCM7057RCZZ	5- 82	AB		C	
QCNCM7125BH0i	6- 2	AN		C	
QCNCM7176BH1J	6- 3	AD		C	
QCNCM7207BH4J	5- 83	AQ		C	
QCNCW1057ACZZ	6- 4	AB		C	
QCNCW2423BH0E	5- 81	AE		C	
QCNCW6882BH1A	5- 84	AG		C	
QCNCW7081BHZZ	5- 85	AB		C	
QCNCW7118BH0i	5- 86	AG		C	
QCNCW7118BH1A	5- 87	AG		C	
QCNCW7201BH1E	5- 89	AK		C	

PARTS CODE	NO.	PRICE RANK	NEW MARK	PART RANK	
QCNCW7202BH1E	9- 3	AK		C	
QCNCW7242BH0B	7- 13	AD		C	
QCNCW7243BH3D	11-204	AV		C	
QCNCW7245BH1J	5- 91	AG		C	
QCNCW7246BH0H	5- 90	AG		C	
QCNW-1035CCZZ	1- 27	AL		B	
QCNW-7121RCZZ	1- 43	AD		C	
QCNW-7872BHZZ	1- 30	AK		C	
QCNW-7876BHZZ	5- 92	AQ		C	
QCNW-7877BHZZ	8- 2	AN		C	
QCNW-7878BHZZ	1- 7	AK		C	
QCNW-7880BHZZ	1- 19	AF		C	
QCNW-7881BHZZ	2- 3	AG		C	
QCNW-7886BHZZ	7- 14	AG		C	
QCNW-7889BHZZ	5- 93	AG		C	
QCNW-7895BHZZ	11- 4	AF		S	
QCNW-7914BHZZ	6- 5	AF		C	
QCNW-7915BHZZ	7- 15	AL		C	
QCNW-7925BHZZ	11-203	BF	N	C	
QCNW-7926BHZZ	11-205	AF	N	C	
QFS-A1037CCZZ	5- 95	AC		A	
QFS-C2521TAZZ	7- 16	AE		A	
QFS-C4301CCZZ	5- 94	AE		A	
QFSHD2109AFZZ	5- 12	AC		C	
〃	7- 7	AC		C	
QPLGA0006QCZZ	1- 27	AQ		B	
QSŌCZ2042SC32	5- 96	AE		C	
QSW-M6872BHZZ	4- 25	AR		B	
QSW-S0744AFZZ	5- 97	AG		B	
QTANZ6661BHZZ	1- 35	AE		C	
【R】					
RALMB6645RCZZ	5- 98	AH		B	
RCiLC6647RCZZ	5- 99	AE		C	
RCiLC6653BHZZ	7- 17	AS		C	
RCŌRF6696BHZZ	1- 40	AL		C	
RCŌRF6698BHZZ	7- 1	AR		C	
RCŌRF6699BHZZ	3- 15	AU		C	
RCŌRF6702BHZZ	5- 13	AF		C	
RCŌRF7002BHZZ	5- 21	AE		C	
RCRSP6664RCZZ	5-100	AF		B	
RCRSP6676RCZZ	5-101	AG		B	
RCRSZ6644RCZZ	5-102	AD		B	
RTRNP6898BHZZ	1- 29	BK	N	B	
RTRNP9524BHZZ	1- 29	BK		B	
RVR-M5318QCZZ	5-103	AC		B	
【S】					
SPAKA8375BHZZ	4- 41	AD		D	
SPAKA8421BHZZ	3- 3	AX		D	
SPAKA8422BHZZ	3- 1	AX		D	
SPAKC8428BHZZ	3- 4	AZ	N	D	
SSAKH0013HCZZ	3- 6	AA		D	
SSAKH3012CCZZ	3- 10	AA		D	
SSAKH3015CCZZ	3- 6	AA		D	
SSAKH4231CCZZ	3- 5	AA		D	
【T】					
TCADH6788BHZA	3- 13	AC		D	
TCADZ2001BHZA	3- 16	AM		D	
TGANE1001BHZC	3- 9	AG		D	
TiNSE7423BHZZ	3- 7	BD	N	D	
TiNSF7425BHZZ	3- 7	BD	N	D	
TiNSG7427BHZZ	3- 7	BD	N	D	
TiNSN7240BHZZ	3- 8	AF		D	
TiNSS7429BHZZ	3- 7	BD	N	D	
TLABH7092BHZZ	2-101	AP	N	D	
TPAPR6645RC05	10- 1	AY		S	
【U】					
UBATZ6661BHZZ	1- 20	BA		B	
UBNDA6629BHZZ	3- 18	AA		C	
UKŌG-6634RCZZ	11- 12	AX		S	
UKŌG-6705RCZZ	11- 11	BC		S	
UKŌG-6725BHZZ	11- 13	BB		S	
【V】					
VCCCTV1HH101J	5- 22	AA		C	
VCCCTV1HH220J	5- 23	AA		C	
VCCCTV1HH221J	5- 24	AA		C	
VCCCTV1HH270J	5- 25	AC		C	
VCCCTV1HH331J	5- 26	AA		C	
VCCCTV1HH470J	5- 27	AA		C	
VCEAGA1CW106M	5- 14	AA		C	
VCEAGA1CW337M	5- 15	AB		C	
VCEAGA1CW476M	5- 16	AB		C	

PARTS CODE	NO.	PRICE RANK	NEW MARK	PART RANK	
VCEAGA1HW105M	5- 17	AB		C	
VCEAGA1HW106M	5- 18	AA		C	
VCEAGA1HW107M	5- 19	AA		C	
VCEAGA1HW226M	7- 8	AB		C	
VCEAGA1HW228M	5-104	AB		C	
〃	7- 18	AB		C	
VCEAGU1CW108M	5-105	AD		C	
VCEAGU1HW338M	7- 19	AT		C	
VCEAGU2AW106M	5- 20	AB		C	
VCKYTV1HB102K	5- 28	AA		C	
VCKYTV1HB103K	5- 29	AB		C	
VCKYTV1HB222K	5- 30	AA		C	
VCKYTV1HF104Z	5- 31	AA		C	
VCQYNA1HM333K	7- 9	AA		C	
VHD1SR1544001	5- 34	AB		B	
VHD1SS353//-1	5- 35	AB		B	
VHDCP301///-1	7- 20	AL		B	
VHDPS156///-1	7- 6	AE		B	
VHDSFPL52V/-1	5- 36	AC		B	
VHEPTZ6.2A/-1	5- 32	AH		B	
VHEUDZ5.1B/-1	5- 33	AC		B	
VHi27040RBK1A	5-106	BM	N	B	
VHi4AC16///-1	5-107	AK		B	
VHiD780021505	5- 1	AT		B	
VHiF258024PC/	5- 2	AZ		B	
VHiG76C256F70	5- 3	BC		B	
VHiH641510810	5- 4	BA		B	
VHiHM128F12SL	5- 5	BN		B	
VHiKA34063A-1	5-108	AP		B	
VHiKiA393F/-1	5- 6	AK		B	
VHiKiA431F/-1	5- 37	AK		B	
VHiLM2574-ADJ	7- 21	AU		B	
VHiLZ9AH39/-1	5- 7	BA		B	
VHiMAX211CAi1	5- 8	AW		B	
VHiSN74HC00DR	5- 9	AG		B	
VHiTD62308F-1	5- 10	AH		B	
VHiTD62503F-1	5-110	AF		B	
VHPHDSP5621-1	8- 3	AM		B	
〃	9- 2	AM		B	
VHViCPS0.5/-1	5-114	AF		B	
VRD-RC2EY122G	7- 2	AA		C	
VRD-RC2EY183J	7- 3	AA		C	
VRD-RC2EY223G	7- 4	AA		C	
VRD-RC2EY270J	9- 1	AA		C	
VRD-RC2EY300J	8- 1	AA		C	
VRG-ST2EJ100J	7- 5	AC		B	
VRS-TQ2BB000J	5-115	AA		C	
VRS-TS2AD000J	5- 38	AA		C	
VRS-TS2AD100J	5- 39	AA		C	
VRS-TS2AD101J	5- 40	AA		C	
VRS-TS2AD102F	5- 41	AA		C	
VRS-TS2AD102J	5- 42	AA		C	
VRS-TS2AD103J	5- 43	AA		C	
VRS-TS2AD104J	5- 44	AA		C	
VRS-TS2AD123J	5- 46	AA		C	
VRS-TS2AD151J	5- 47	AA		C	
VRS-TS2AD153G	5- 48	AA		C	
VRS-TS2AD163F	5- 49	AA		C	
VRS-TS2AD181J	5- 50	AA		C	
VRS-TS2AD183F	5- 51	AA		C	
VRS-TS2AD203J	5- 52	AA		C	
VRS-TS2AD221J	5- 53	AA		C	
VRS-TS2AD222J	5- 54	AA		C	
VRS-TS2AD223J	5- 55	AA		C	
VRS-TS2AD241J	5- 56	AA		C	
VRS-TS2AD272J	5- 57	AA		C	
VRS-TS2AD331J	5- 58	AA		C	
VRS-TS2AD333J	5- 60	AA		C	
VRS-TS2AD334J	5- 61	AA		C	
VRS-TS2AD362F	5- 62	AA		C	
VRS-TS2AD472J	5- 64	AA		C	
VRS-TS2AD473J	5- 65	AA		C	
VRS-TS2AD562J	5- 66	AA		C	
VRS-TS2AD563J	5- 67	AA		C	
VRS-TS2AD680F	5- 68	AA		C	
VRS-TS2AD822G	5- 70	AA		C	
VRS-TS2AD912G	5- 71	AA		C	
VRSTS2AD1151F	5- 72	AA		C	
VRSTS2AD1330F	5- 73	AA		C	
VS2SA1036KQRC	5- 74	AB		B	
VS2SC2412K/-1	5- 75	AB		B	

PARTS CODE	NO.	PRICE RANK	NEW MARK	PART RANK	
VS2SC4153-/-1	5-111	AG		B	
VS2SJ328-Z/-1	5- 11	AP		B	
VSKRC106S//-1	5- 76	AD		B	
VSKTA1663//-1	5- 77	AE		B	
VSKTD998///-1	7- 22	AS		B	
【X】					
XBBSC30P08000	1- 9	AA		C	
XBPSD30P06000	5-113	AA		C	
〃	7- 23	AA		C	
XBPSD30P06K00	1- 44	AA		C	
XBPSD40P06K00	4- 28	AA		C	
XEBSD30P08000	1- 18	AA		C	
〃	11- 4	AA		C	
〃	11-202	AA		C	
XEBSD30P10000	1- 41	AA		C	
XHBSD30P04000	1- 34	AA		C	
〃	11- 4	AA		C	
XHBSD40P06000	1- 28	AA		C	
XHBSD40P08000	4- 35	AA		C	
XHPSC30P08000	4- 37	AA		C	
XHPSD30P08000	4- 46	AA		C	
XHSSD30P06000	4- 16	AA		C	
XJPSD30P06000	2- 18	AA		C	
XJPSD30P08000	2- 5	AA		C	
XJPSD30P12X00	1- 47	AB		C	
XNESD30-24000	1- 32	AA		C	
XNESD60-50000	4- 12	AA		C	
〃	4- 40	AA		C	
XRESJ40-06000	4- 11	AA		C	
XRESJ50-06000	4- 17	AA		C	
XUBSD30P08000	4- 3	AA		C	
XUPSD40P10000	1- 16	AA		C	

PARTS CODE	NO.	PRICE RANK	NEW MARK	PART RANK	

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